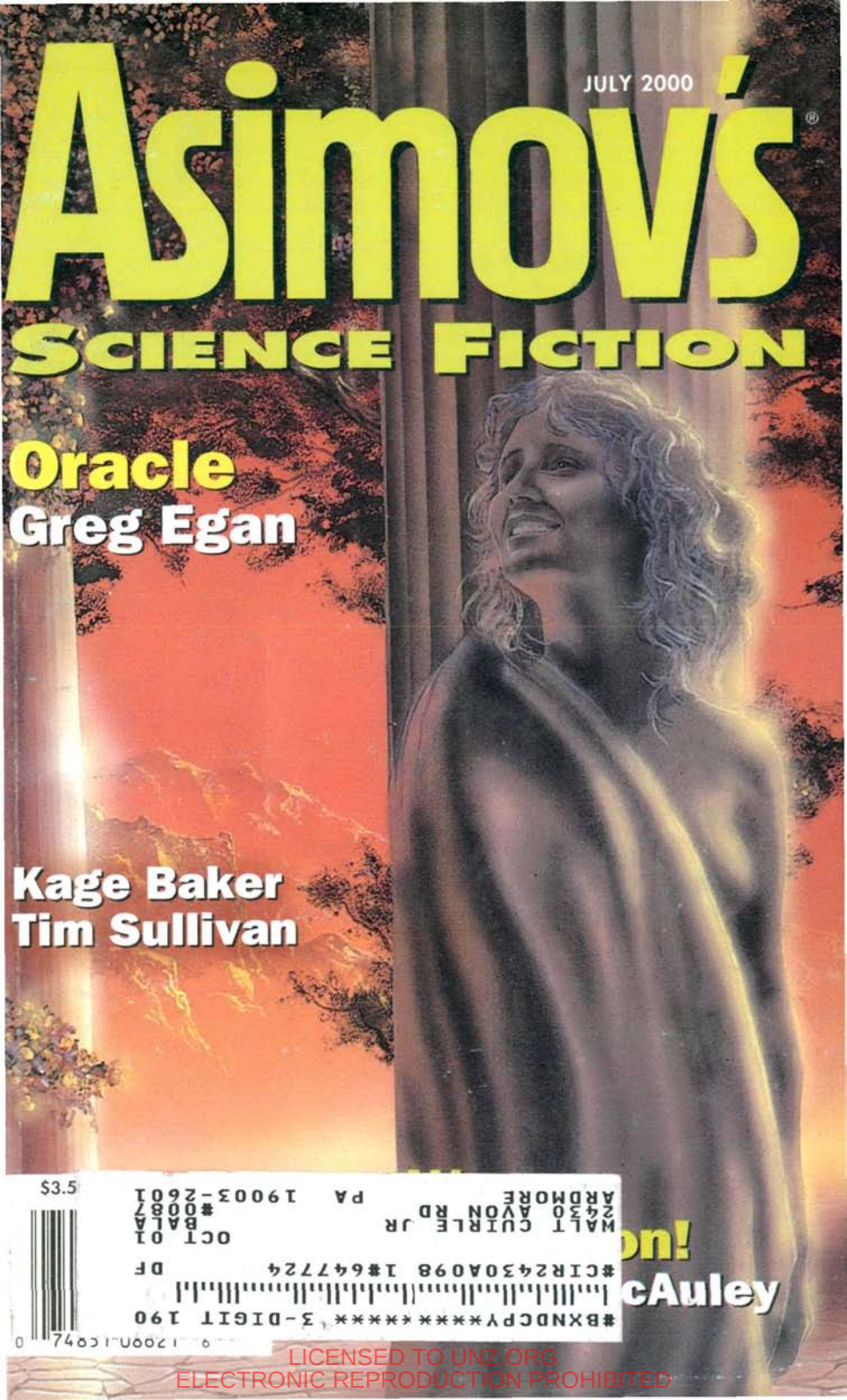

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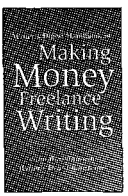

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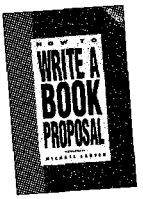

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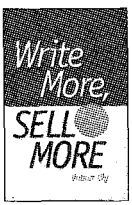

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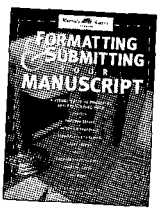

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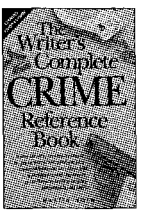

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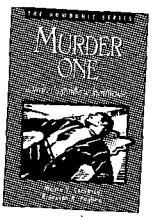

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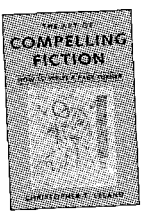

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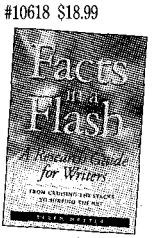

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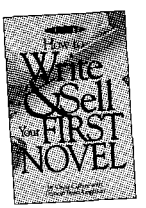

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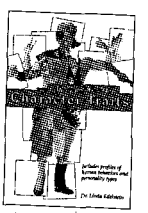

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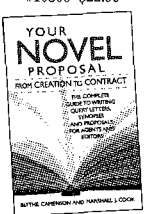

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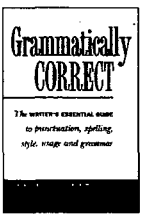

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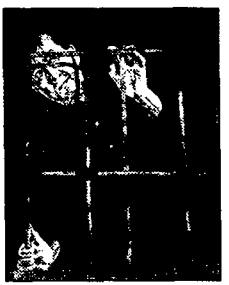

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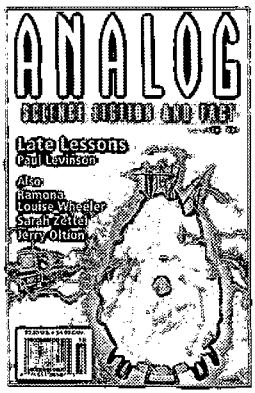

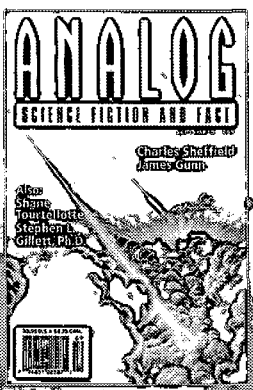

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REFLECTIONS

by Robert Silverberg

ALL THAT IS SOLID MELTS INTO AIR

Karl Marx said that, or perhaps it was Friedrich Engels, in *The Communist Manifesto,* and they were talking about the breakdown of the ancient societal bonds under the pressures and uncertainties of the industrial revolution.

Certainly life is less quiet now than it was in the dear old days of the feudal system, and a good deal that was solid in the world of Marx's time has indeed melted into air, some of it figuratively and some all too literally, since the *Manifesto* first appeared in 1848. One interesting example of literal melting is going on right at the present time—the shrinking of the polar ice caps as a result of global warming, which is a side effect of industrialism that Marx probably did not foresee at all. And as the too too solid ice of the Arctic retreats, artifacts of the pre-industrial world that long were kept in nature's deep-freeze locker are coming to light.

In Canada, for example, the glaciers have receded a hundred feet and more in recent times, bringing forth such things as ancient bows and arrows, spears, pellets of caribou dung that register an age of 7400 years in carbon-14 testing, and small wooden darts that show a radiocarbon age of around 4300 years. Probably the most interesting discovery so far is that of a nearly complete human body, dubbed the "iceman"—an Indian hunter in his twenties who stumbled into a crevasse about A.D. 1450 and has been buried there, most of him in a fine state of preservation, ever since. Scattered near his body lay an assortment of weapons and tools made of bone and wood, perhaps belonging to him, perhaps those of other travelers who passed that way in antiquity.

Among these items, mysteriously, is a small lump of iron. The Indians of what is now British Columbia, where the body was found, did not begin using iron for another three hundred years. Had the piece come ashore in the wreckage of some ship from Asia that was trading along the western coast of North America four decades before Columbus' first voyage? Did it originate among the iron-working Eskimos, five hundred miles to the north? Or—boldest speculation of all—had that bit of metal made its way across northern trade routes from the Viking settlers who landed on Canada's eastern shore about A.D. 1000?

A great deal of further study will be necessary before these questions can be answered. Interestingly, the Indians of British Columbia are cooperating wholeheartedly in the research—a striking contrast to the behavior of their cousins south of the border, who have taken, lately, to demanding instant reburial of ancient human remains, claiming them to be "ancestral" and denouncing any kind of scientific examination as sacrilegious.

The iceman's remains were found in Tatshenshini-Alsek Provincial Park, which Canada recognizes as the traditional territory of the Champagne and Aishihik First Nation, an Indian tribe that has some 1,130 members. Since 1995, the tribe has held veto rights over all ar-

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chaeological work done in the park, and when the iceman came to light in August 1999, public announcement of the find was delayed for ten days to allow scientists to consult with tribal elders about it.

Instead of insisting on an immediate reburial, this Indian group—who named the iceman Kwaday Dan Sinchi, "Long Ago Person Found"—readily agreed to permit scientific study of the find, including carbon-14 dating and DNA analysis. As Bob Charlie, the chief of the tribe, put it, Long Ago Person's death appears to have been the result of an accident, and, he said, "even today, if you have an accident, you have an autopsy, you try to find out what happened."

But there is more in it for the tribe than that. They hope that the defrosted remains will provide a link to their own oral history, which tells how their ancestors traveled by foot along mountain trails to trade with the native peoples of British Columbia's coast. Eighteenth-century European accounts of the Indians of the region describe them as wearing broad-brimmed conical hats much like the one found near the iceman. If it could be shown that the iceman's people were ancestral to the present-day inhabitants of the region, a continuous tribal line of occupation spanning five centuries would be established. "There is some excitement among our citizens," said Bob Charlie, "that the DNA might indicate who his present-day relatives are."

All this is very different from the reactions of the Umatilla tribe of Washington State to the discovery of the nine-thousand-year-old bones of Kennewick Man in a sandy flat along the banks of the Columbia River. In my column in the October-November 1998 *Asimov's* I told how the Umatillas, who claim territorial jurisdiction over the area where

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Kennewick Man was found, objected strongly to any sort of scientific testing of the relics, arguing that it would go against their traditional beliefs forbidding any sort of disrespect for the dead. They wanted the Kennewick bones handed over to them then and there for reburial as a tribal ancestor, which would have been tantamount to their destruction, and only a quick lawsuit by a group of dismayed archaeologists kept the federal government from doing just that.

The special problem with Kennewick Man is that his bones are not at all similar to those of modern-day American Indians. Their physical characteristics are so markedly different that the first anthropologist who examined them (who was also the local coroner) opined that they were those of a white man, perhaps some settler or trapper of the eighteenth century. When radiocarbon dating revealed that the bones were between 9300 and 9600 years old, though, the dispute quickly became political—for if white men, perhaps of European origin, were wandering around in that part of the New World ninety centuries ago, what becomes of the Indians' claim to be the original human occupants of the Americas?

That was an uncomfortable question for the Umatillas. And so they saw no need to have the bones studied. "We already know our history," a tribal spokesman asserted. "It is passed on to us through our elders and through our religious practices. If this individual is truly over nine thousand years old, that only substantiates the belief that he is Native American"—a neat bit of circular reasoning that would permit the Umatillas to put troublesome Kennewick Man safely back underground before anyone could determine much more about him.

The archaeologists' lawsuit managed to head that off, however, aided by a parallel suit brought by the Asatru Folk Assembly, a California pagan sect that worships the ancient Norse gods and had some wild hope that Kennewick Man, because he had been of Caucasian race, might just be one of *their* own remote ancestors. The last-minute legal rescue made it possible to subject the skeleton to preliminary scientific scrutiny, the results of which were made public by the Interior Department in the fall of 1999.

Those findings confirmed that Kennewick Man's bones were not those of an American Indian. But, although they were more Caucasian in appearance than anything else, they weren't those of a European, either. Their closest links were to the non-Mongoloid peoples of Asia and the Pacific region—the Polynesians, say, or perhaps the Ainu, that poorly understood minority group that has inhabited the northern islands of Japan since prehistoric times.

This makes the situation look bad for the hopes of the Asatru Folk Assembly, but otherwise simply adds to the general mystery. It is a long-established theory that the first human inhabitants of the Americas came to the New World out of Asia thousands of years ago, traveling via a now-vanished land bridge connecting Siberia and Alaska at what is now the Bering Strait, and that these people, genetically Mongoloid, were the ancestors of the Indians. The Kennewick bones raise the possibility that non-Mongoloid peoples came here too in those ancient days, arriving by boat from the Pacific. (The Polynesians and the Ainu both have long maritime traditions.)

Perhaps these early seafarers died out before they were able to establish permanent colonies in the Americas, or else they were absorbed genetically into the various

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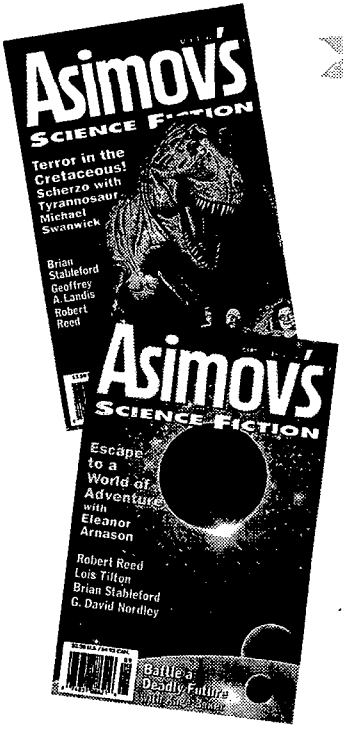

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Indian stocks: at this point, nobody knows. The Kennewick bones are being held at the Burke Museum in Seattle pending DNA analysis and other study by anthropologists. One thing is certain, though: if the Umatilla had been allowed to rebury them as being those of some early tribal ancestor, nothing at all would ever have been learned about them. "We already know our history," the Umatillas have said. But the Umatillas hold no rights of ownership over human history in general, only over their own tiny facet of it. The rest of us must remain free to learn what we can about how the human species—and we are all, even the Umatillas, members of one and the same species—came to occupy the earth. Destroying evidence is an unfruitful pastime. As Bob Charlie of the Champagne and Aishihik First Nation reminds us, when a body is found, "you have an autopsy, you try to find out what happened."

We'll know more about Kennewick Man and his place in the human saga sooner or later, perhaps even before this column sees print. And even bigger news of ancient humanity may be forthcoming out of the Yukon in the years ahead, as the too, too solid ice of those glaciers continues to melt away and the migration routes of the first Americans are laid bare after thousands of years in the deep freeze. We owe some thanks to Bob Charlie and other enlightened tribal leaders of his kind, up there in Canada, for creating an atmosphere in which it will be possible to probe these mysteries without political rancor and willful obfuscation. ❍

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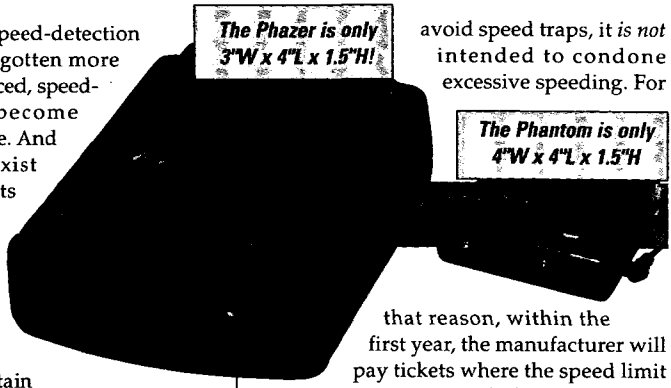
How to make your car invisible to radar and laser

Rocky Mountain Radar introduces a device guaranteed to make your car electronically "invisible" to speed traps—if you get a ticket while using the product, the manufacturer will pay your fine!

It seems that as speed-detection technology has gotten more and more advanced, speeding tickets have become virtually unavoidable. And although devices exist that enable motorists to detect these speed traps, they are outlawed in many states...including mine.



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Perfectly legal. Some radar devices have been outlawed because they *transmit* scrambling radar beams back to the waiting law enforcement vehicle. The Phazer, however, *reflects* a portion of the signal plus an added FM signal back to the police car. Unless you are a resident of California, Minnesota, Oklahoma, Virginia or Washington, D.C., using the Phazer is completely within your legal rights.

Encourage responsible driving. While the Phazer *is* designed to help you (and me) avoid speed traps, it *is not* intended to condone excessive speeding. For that reason, within the first year, the manufacturer will pay tickets where the speed limit was not exceeded by more than 30%, or 15 miles per hour, whichever is less.

Double protection. If you prefer to be *notified* when you are in range of a police radar, the Phantom is for you. The Phantom combines the Phazer with a radar detector. It's legal in every state except California, Minnesota, Oklahoma, Virginia and Washington, D.C. Ask your representative for more details!

Risk-free. The Phazer and Phantom are both backed by our risk-free trial and three-year manufacturer's warranty. Try them, and if you're not satisfied, return your purchase within 90 days for a "No Questions Asked" refund.

The Phazer:
Three credit-card payments of $66.50 $14 S&H

The Phantom:
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Please mention promotional code **4452-18184.**

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The Phazer makes your car invisible to police radar and lasers or the manufacturer will pay your speeding ticket!

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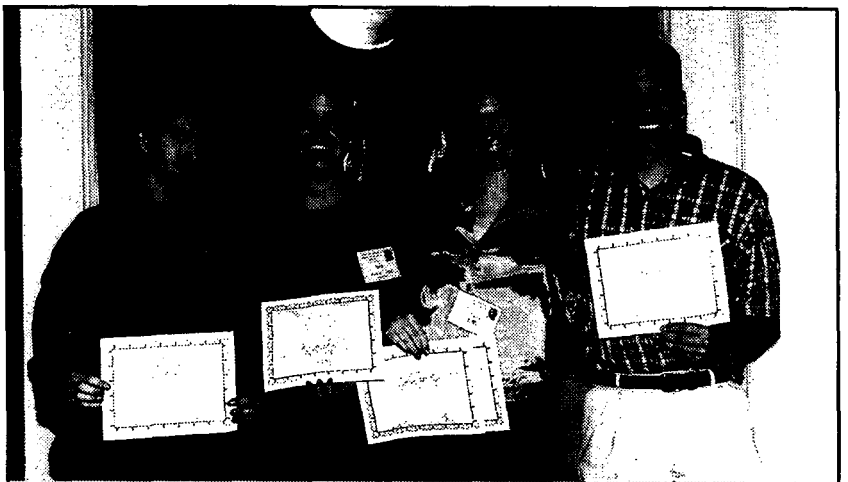
Sheila Williams

The 2000 ISAAC ASIMOV AWARD



Isaac Asimov Award winners: Elan Ruskin, Beth Adele Long, Lena DeTar, and Mark Jacobsen.

Photo credit: Beth Gwinn

Once again, I was dragged from New York City in March to sunny Ft. Lauderdale, Florida, during spring break, to bestow the Isaac Asimov award for Undergraduate Excellence in Science Fiction and Fantasy Short Story Writing. This year's winner, Beth Adele Long, graduated in December 1999 from Embry-Riddle Aeronautical University in Daytona Beach, Florida, where she majored in engineering physics. Having just returned from working at a mission hospital in Peru, Beth was about to begin employment as a software engineering analyst for a defense contractor in Maryland. The International Association for the Fantastic in the Arts, which co-sponsors the award with *Asimov's Science Fiction* magazine, flew the author in for an all-expense paid weekend at the annual Conference on the Fantastic in the Arts. Beth attended numerous papers and authors' readings, and was delighted to have the chance to meet one of her long-time favorite writers—Nancy Kress.

IAFA Award Administrator Rick Wilber, Gardner Dozois, and I were the judges for the Asimov Award. For the first time ever, all of the award finalists came to the Confer-

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ence. At a banquet on Saturday, March 25, 2000, I presented Beth with a certificate and a check for $500 from the magazine.

Our first runner-up, Mark Jacobsen, was a sophomore at the United States Air Force Academy studying aeronautical engineering. Mark seems to have an itch to leave the planet. He's a gliding instructor who hopes to be a pilot, and his favorite science fiction tales are space stories. He too was delighted to have the chance to meet one of his favorite authors, and Nancy Kress's husband, Charles Sheffield. Mark received a two-year complimentary subscription to *Asimov's* for his story, "Father Out and Farther Down."

Our second-runner-up, Lena DeTar, was a sophomore at Macalester College in St. Paul, Minnesota. Lena is studying anthropology and premed. She received a one-year subscription to *Asimov's* for her story, "Fire and Ice." In addition to this distinction, Lena was presented with an honorable mention for her story, "Clearing Up."

Our second honorable mention, Elan Ruskin, was a junior studying computer science engineering at the University of Pennsylvania. Dressed all in black, Elan cut quite a figure. He had a wonderful time a the conference meeting everyone, especially his hero and fashion soulmate, Neil Gaiman.

Other authors in attendance included Brian Aldiss, Octavia Butler, Suzy McKee Charnas, Stephen R. Donaldson, Andy Duncan (an *Asimov's* Nebula award finalist), Kathleen Ann Goonan, Joe Haldeman, Elizabeth Hand, Robert Holdstock, John Kessel, Daniel Keyes, David Lunde, Patricia McKillip, and Robert J. Sawyer.

Last year's winner, Marissa K. Lingen, has revised her story, "In the Gardens and the Graves." It can be found on our website—*www.asimovs.com*. We plan to put Beth's story up there as well.

Asimov's is proud to support these academic awards with IAFA. The International Association for the Fantastic in the Arts is a worldwide network of scholars, educators, writers, artists, filmmakers, critics, editors, publishers, and performers who share an interest in studying and celebrating the fantastic in all artforms, disciplines, and media. The award is also supported by the School of Mass Communications at the University of South Florida in Tampa, Florida.

We are now actively looking for next year's winner. The deadline for submissions is December 15, 2000. All full-time undergraduate students at any accredited university or college are eligible. Stories must be in English, and should run from 1,000 to 10,000 words. No submission can be returned, and all stories must be previously unpublished and unsold. There is a $10 entry fee, with up to three stories accepted for each fee paid checks should be made out to the Asimov Award. There is no limit to the number of submissions from each writer. Each submission must include the writer's name, address, phone number, and college or university on the cover sheet, but please remove your name from the manuscript.

Before entering the contest, please contact Award Administrator Rick Wilber for more information, rules, and manuscript guidelines. Rick can be reached care of:

Asimov Award
School of Mass Communications
University of South Florida
Tampa, Florida 33620

Next year's winner will be announced at the 2001 Conference on the Fantastic, in the pages of *Asimov's Science Fiction* magazine, and on our website. O

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On the Net

James Patrick Kelly

INBOX

Listing

Although I've spilled a lot of words in this column pointing you toward various sites on the world wide web, what I mostly need the internet for is email. This column marks my second anniversary as your net columnist and I've submitted every single installment (usually late) as an email attachment to the ever-patient Sheila Williams.* Ditto for several of the stories that have appeared in *'Mov's* over the last few years. Yesterday, I had yet another cool internet moment: Gardner accepted the novelette that appeared in last month's issue by email.

Email is not the sexiest appendage of the internet, only the most useful. But it still has problems, some of which could be solved by practicing basic netiquette. For instance, don't send honking big attachments to people unless you're sure that they're interested. That humorous jpg of Bill and Hillary might choke poor Uncle Chet's modem. Even though you can now send email in an electric purple 20 point Funky Chicken font, don't. At least, not to me. Oh and pay attention when replying to listservs. *Listservs?* You've been on the net for how long and you aren't on any listservs? Listservs are a kind of automated mailing list; people interested in a specific topic subscribe voluntarily. When you send message to a listserv, everybody on the list gets it. The folks on the listserv expect the messages to hew to the topic, more or less; topics range from joke swapping to recipe swapping to spouse swapping. Listserv, by the way, is a registered trademark licensed to **L-Soft International, Inc.** <*http://www.lsoft.com/*> and is a commercial software product. But in the grand tradition of Kleenex and Xerox, it has come to refer to any automated email list, even those run by freeware and shareware programs. If you want to fill up your inbox fast, you might surf over to **CataList** <*http://www.lsoft.com/lists/listref.html*>, the official Listserv compendium of some 27,764 public lists. Oddly enough, I couldn't find several of the genre lists I know of on CataList, so there must be a better site for finding lists. Help, anyone?

The reason you should be careful when replying to listservs is that it's easy to forget that replies go to the whole list. Suppose your lover makes a particularly telling point on the company listserv and you post a reply to congratulate her and, in the same message, absentmindedly dis-

*Only regular *columnists are allowed to send in their original material via email. All other manuscripts must be submitted in the old-fashioned manner (i.e., through the U.S. Mail on hard copy). Jim's June story, "Feel the Zaz," was snail mailed just like all the other stories we received. A story must be accepted for publication before we ask for it electronically.—SW*

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cuss your plans for Thursday's assignation and then crack a joke about the lugnuts in the front office.

You laugh, but it happens all the time.

Fried Spam

The biggest problem with email is, of course, spam. According to the Gartner Group, 91 percent of users get spam at least once a week. I use the net a lot and until recently I was getting upward of ten a day. *Increase traffic to your website by taking advantage of a surefire investment strategy recommended by naked college girls who will be retiring in two to three years guaranteed thanks to low priced laser printer toner and cable descramblers that stop hair loss now!* They say that things will get worse before they get better, which is why I signed up to have my email screened for spam by **Brightmail** <*http://www.brightmail.com*>.

Until recently, Brightmail was targeting its spam screening to ISPs, but as I write this, it has just begun to offer free service to individuals. Now you can configure your email software to filter incoming spam, but, in my experience, this is a dicey proposition. Besides, you still end up downloading messages you don't want to see. The beauty of Brightmail is that you never get the spam it catches. If you want, you can log on to the Brightmail site and check your caught spam. However, as good as Brightmail sounds in theory, I can't bring myself to recommend it quite yet. I've only been using it for about a week now and I have two complaints: it is slow, slow, *slow* and it still lets some spam slither through. However, it has yet to catch anything that wasn't spam. At the very least, Brightmail is worth a look.

I've got mail

Speaking of email, when I took this gig, I encouraged you all to let me know what you thought. Thanks to everyone who offered suggestions and corrections. Here are a few that popped out of my inbox.

Reacting to a column about booksellers on the net, reader Chris Aylott took me to task for not mentioning the SF specialty bookstores that are online. Now Chris had an ax to grind, since he is a proprietor of the **Space-Crime Continuum** <*http://www.io.com/~aylott/*>, a bookstore in Northhampton, MA. Nevertheless, his point was well taken: the last thing I want to do is disrespect these hard-working folks. So let me put it in black and white and I don't care if Messrs Barnes, Noble and Borders read it. Jim says you should buy your science fiction from specialty booksellers. We need to maintain diversity in the ecosystem of bookselling and let's not forget that SF booksellers are experts who often know the genre better than most writers. Chris recommended the website of **Future Fantasy Bookstore** <*http://futfan.com/home.html*> in Palo Alto, CA, as one he particularly liked. He also passed along a list of SF booksellers on **Yahoo** <*http://dir.yahoo.com/Business_and_Economy/Companies/Books/Shopping_and_Services/Booksellers/Science_Fiction__Fantasy__and_Horror/*> and another just off **Anders Svensson's Homepage** <*http://www-pp.hogia.net/a.svensson/SF/sfbookframe.html*>. I should mention that there is much more to Anders' page than the bookseller list. This personal page designed by a Swedish fan is very ambitious and definitely worth a click.

Reader and Marsmeister Bob Kanefsky invited me to point my browser at his **Roving Mouse Mars Atlas** <*http://www.roving-*

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mouse.com/planetary/Mars/Atlas/> and so I did. If you've read any of the slew of fine Mars books that have been published recently, you owe it to yourself to explore this site. Click on a picture of the Red Planet and the site zooms in on the geologic feature you have chosen. Or if you know the name of a particular feature, you can call up a view from an index. Actually, Mars is just a part of the Roving Mouse site. I can also recommend the **Rove to:/Anywhere on Earth** <*http://rove.to/*> for glorious shuttle photography of the Mother Planet. Here you will find 387,033 images indexed by country and, in the US, by state. God herself doesn't have a better view.

A reader with the mysterious handle of *3case* suggested I check out the **Virginia Tech Speculative Fiction Home Page** <*http://ebbs.english.vt.edu/vtsf/sf-project 2.html*>, where they are digitizing materials from the SF magazine and book collection of one William Heron. Heron amassed five thousand issues of two hundred different publications dating from 1926 to 1987. Online for your reading pleasure are Volume 1, Number 1 of *Air Wonder Stories* from July 1929 as well as several issues of *Cosmic Stories* from the 1940s, an issue of *Marvel Science Stories* from 1950 and *Super Science Stories* from 1941. You've heard a lot of talk about the Golden Age of science fiction, but now you can compare an issue of a magazine from that storied era with, say, your July *Asimov's*.

Andrew Burt, the mastermind of the **Critters Workshop** <*http://www.critters.org*> wrote to announce that Critters was offering two new resources for aspiring writers. One will help people find regional workshops in their area; click to **Critfinder** <*http://www.critters.org/critfinder*>. The other is a wonderful new tool: free, password-protected web pages where members of any workshop can exchange manuscripts. What used to happen in read-ahead workshops, where we would prepare our critiques before the session, is that manuscripts were snailed to everyone a couple of weeks ahead of time. It wasn't cheap making ten copies of a twenty thousand word novella and paying for postage. Now stories on the agenda can be posted to the website. To take advantage of Critters' generosity, drop by the **TESTWW** page <*http://www.critique.org /samplewww*>.

Richard Chandler wrote to criticize comments I made about furry fandom; he set forth his complaints both in an email message to me and also in a post to the newsgrop **alt.fan.furry**. Richard claims that, while there are both furry fans and furry lifestylers, I was wrong when I wrote "Over time a furry fan may evolve into a furry." He makes the point that furry fans and furry lifestylers are two distinct groups who do not necessarily share values or beliefs. When he draws the analogy to Trekkies and Trekkers, I think I begin to understand. My apologies.

Reader and astute critic Rich Horton thought I might like the **Honeyguide Web Log compiled by Raphael Carter** <*http://www.chaparraltree.com/honeyguide/*> and he was right. Raphael writes, "The honeyguide is an African bird that leads humans to beehives, then shares in the spoils when the hive has been opened. This Web Log contains links to some caches of honey I've found on the Net." This is a superb and well-organized links page that reflects Raphael's eclectic interests. Now that I know about it, I intend to stop by often to taste the honey. You should too, and then click over to **Raphael Carter's Home Page** <*http://www.chapar-*

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raltree.com> to sample the rest of this site, created by one of the most amazing new writers of the nineties.

One of the links on the Honeyguide opened the doors of the **Oz Library** <*http://homes.acmecity.com/oz/baum/123*>, which leads me to a confession. I believe that my utter infatuation with Oz is one of the principal reasons I am a writer. As good as the two Oz movies are—and I love them both, although for different reasons—I think that the books are even better. I read and reread them as a kid; one of the first books I ever bought with my own money is the ragged hardcover of *The Wizard of Oz* sitting on the shelf next to my desk. And when my daughter Maura was of an Oz age, I read them aloud to her, all the L. Frank Baum titles.

Trust me, if you're worried about where the next generation of science fiction and fantasy readers is going to come from, then sit a third grader down and start reading her *Ozma of Oz*. Baum wrote fifteen Oz books and after his death Ruth Plumly Thompson continued the series, even though she never quite captured the spirit.

The Oz books are now in public domain and Oz Historian SFZapgun has posted the complete text and some of the charming John R. Neill illustrations on this site. I still think you need to own the books, but if that isn't an option, there's magic in the Oz Library.

Cory Doctorow <*www.craphound.com*> calls himself "a twenty-eight-year-old renaissance geek." Cory was once a student of mine at the Clarion Writers Workshop so I'm proud of the way his career has taken off over the past couple of years. You've probably enjoyed his stuff here in *Asimov's*. I knew Cory had designed websites, but he didn't have one of his own until recently. I was all over it as soon as I got the email announcement of the grand opening and yes, it's way cool. There is one section of it, however, that I had to stay away from. You see, Cory and I have the distinction of being the only two print science fiction magazine internet columnists on the planet. In fact, he was in this game before I was. But when I started writing my column, I had to stop reading his; I didn't want to steal links from the kid. Among other goodies on the site, Cory has an archive of all his past columns. If you like what I'm doing here, give him a click. After all, he taught me everything I know about writing a web column.

Exit

That's enough from me for now. Let's hear more from you. O

We welcome your letters, which should be sent to **Asimov's,** 475 Park Avenue South, New York, NY 10016, or e-mail to **asimovs@dellmagazines.com**. Space and time make it impossible to print or answer all letters, but please include your mailing address even if you use e-mail. If you don't want your address printed, put it only in the heading of your letter; if you do want it printed, please put your address under your signature. We reserve the right to shorten and copy-edit letters. The e-mail address is for editorial correspondence only—please direct all subscription inquiries to: P. O. Box 54033, Boulder, Co 80322-4033.

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AUNT LILY IN HYPERSPACE

Wearing her best hat,
Aunt Lily entered
hyperspace.
I grabbed her foot,
tagged along.
"I'm glad I put on
clean underwear this
morning,"
she yelled back
to me.
So was I.

Hyperspace.
So this was where she went
when she disappeared—
I'd theorized a lover,
a secret addiction to gambling,
an alternate personality
living a life of crime.

"Hang on," she hollered.
A black hole sucked at us
as we zipped past,
almost pulled me loose.

It wasn't right
to look up Aunt Lily's dress
—billowy pink, with
yellow flowers
to match her hat—
but I couldn't avoid it,
holding her ankle
like I was.
Glimpses of dimpled thighs,
scissoring like a swimmer's;
broad white expanse
of panty-clad bottom.
Maybe it was guilt.
Maybe I was prone to hyper-sickness.
I started to get queasy,
lost my grip.

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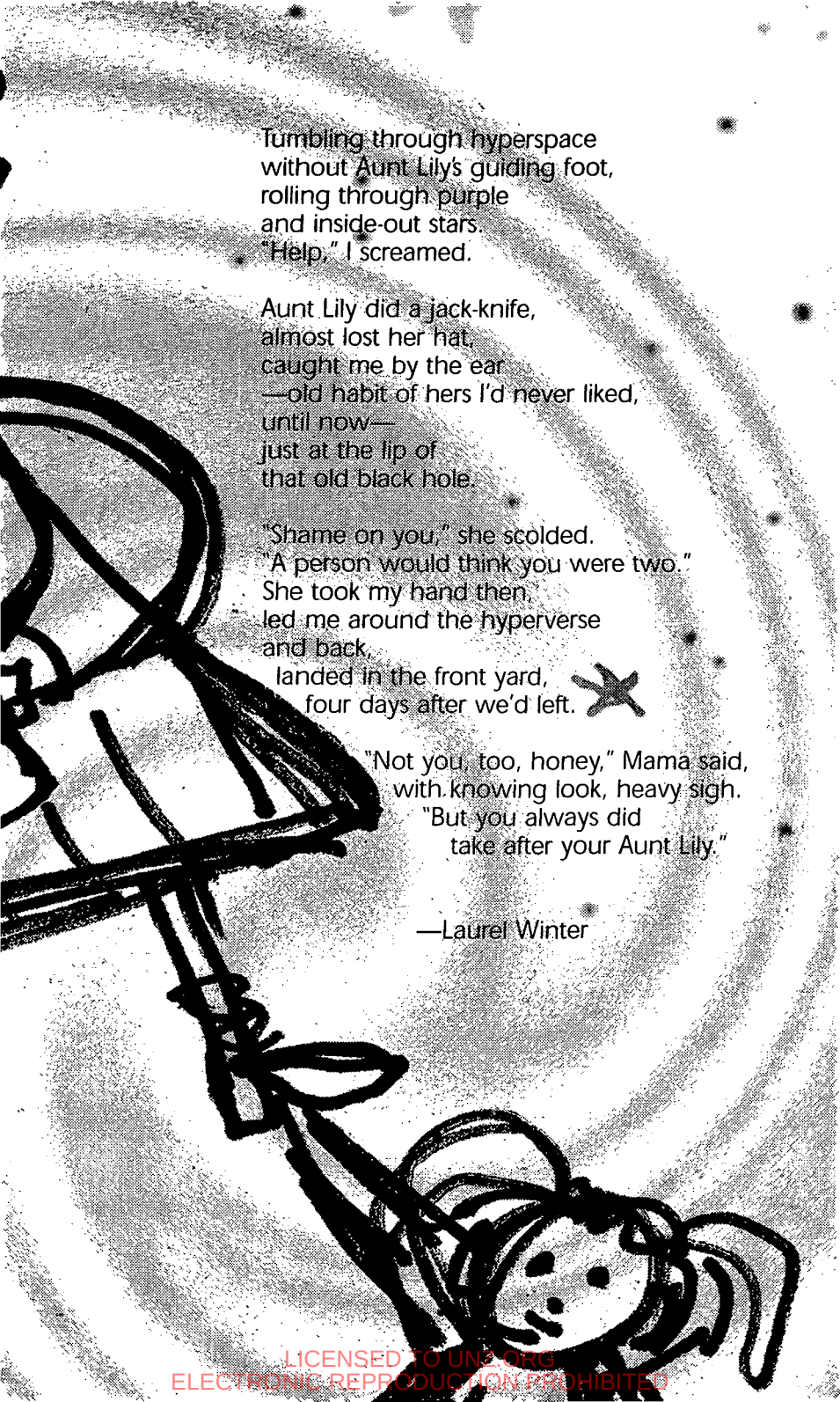

Tumbling through hyperspace
without Aunt Lily's guiding foot,
rolling through purple
and inside-out stars.
"Help," I screamed.

Aunt Lily did a jack-knife,
almost lost her hat,
caught me by the ear
—old habit of hers I'd never liked,
until now—
just at the lip of
that old black hole.

"Shame on you," she scolded.
"A person would think you were two."
She took my hand then,
led me around the hyperverse
and back,
landed in the front yard,
four days after we'd left.

"Not you, too, honey," Mama said,
with knowing look, heavy sigh.
"But you always did
take after your Aunt Lily."

—Laurel Winter

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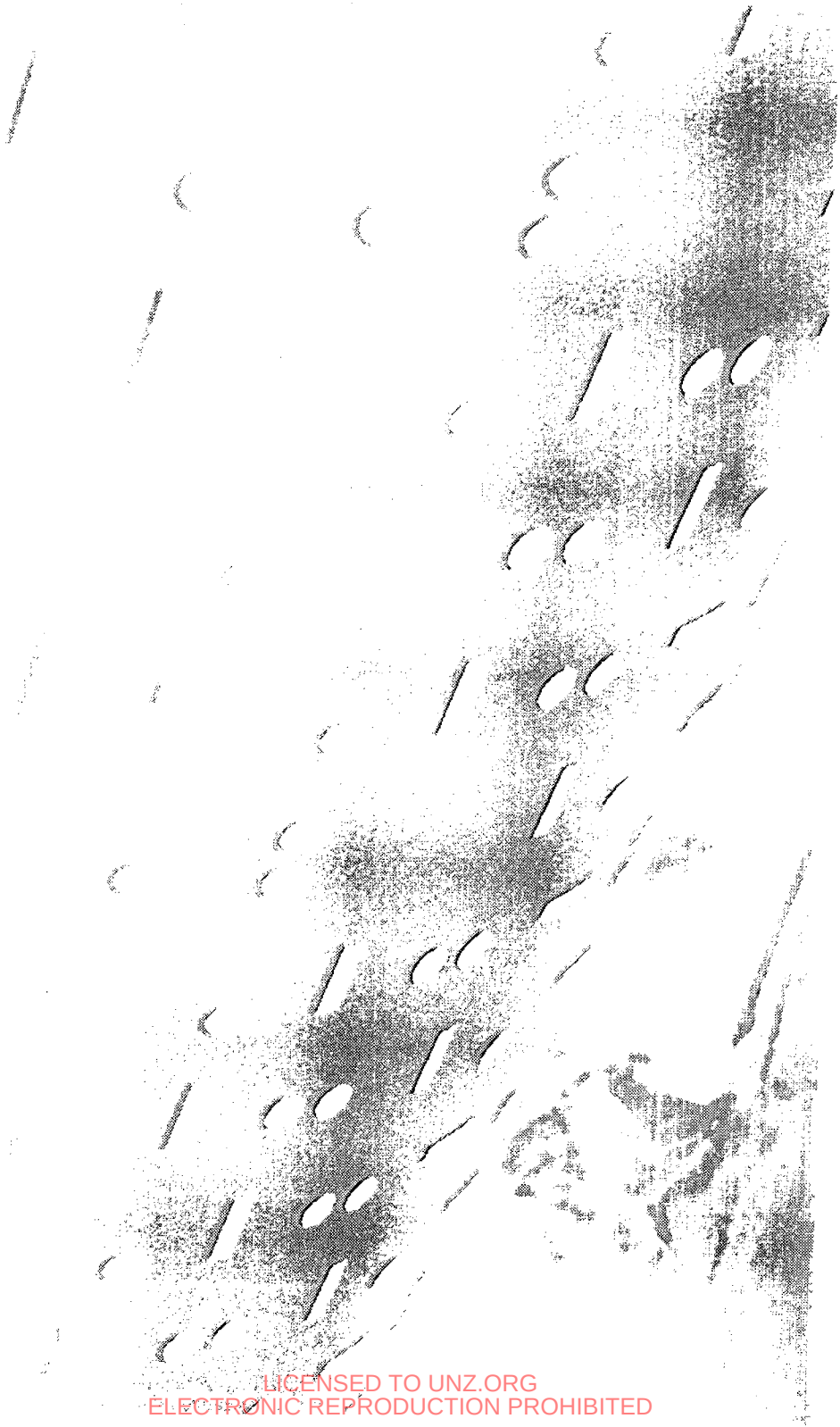

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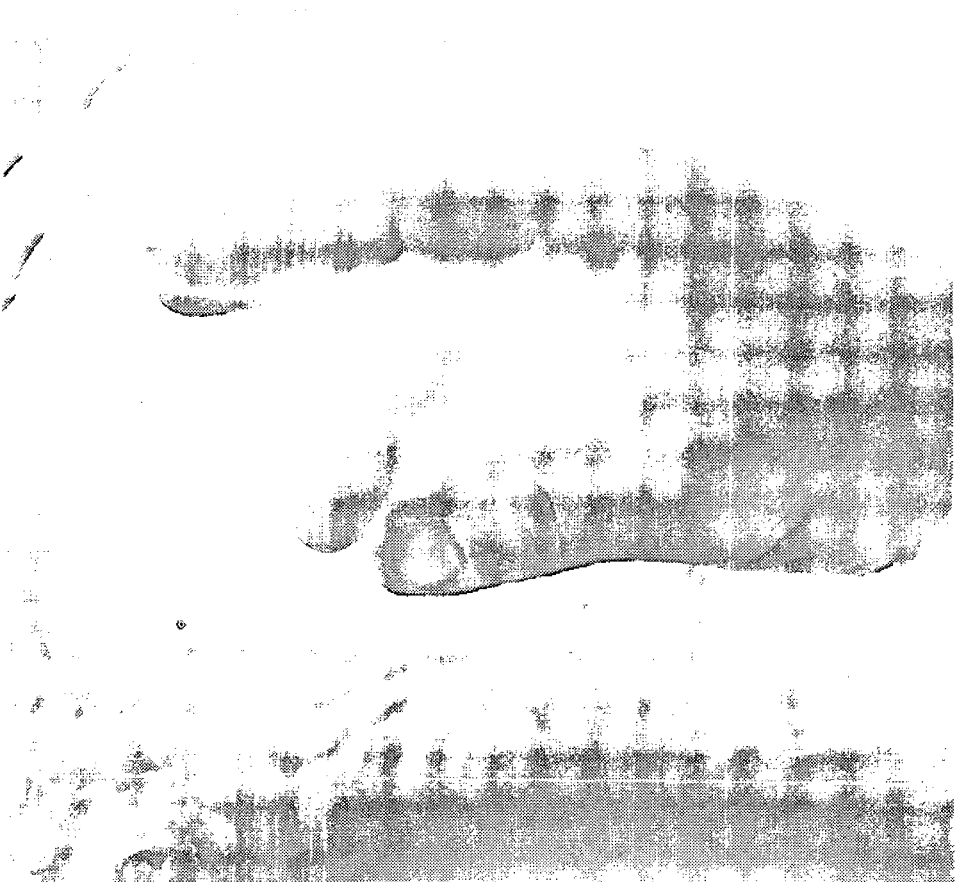

INTERSTITIAL

Paul J. McAuley

Illustration by Alan Giana

Paul J. McAuley was born in England on St. George's Day, 1955. He is the author of ten novels, including *Four Hundred Billion Stars,* which won the Philip K. Dick Memorial Award; *Fairyland,* winner of the Arthur C. Clarke and John W. Campbell Awards; and the Confluence trilogy, *Child of the River, Ancients of Days,* and *Shrine of Stars*. His latest novel, *The Secret of Life,* will be published in the UK in September by HarperCollins. Most of the time, he lives in London.

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Echo huddled under his thin blanket, clutching the pillow to his head and feigning sleep as footsteps marched down the aisle toward his bunk. His chip told him it was just after three in the morning. He was horribly tired, his blood glucose low, his muscles poisoned by fatigue. Ever since the Copernicus Alliance had taken Little Tokyo, some four hundred hours ago, South Pole had been on a war footing. Purity squads had rounded up and executed recalcitrant techs in an orgy of self-righteousness. The upper levels had been evacuated, the greenhouses stripped, the defense systems mobilized. After finishing a twenty-hour shift, Echo had collapsed into his bunk without even making a stop at the canteen, but he was too wired to sleep.

The footsteps drew closer and closer, undeniably vectoring on Echo's bunk. His heartbeat spiked as the thin mylar curtain he had tacked up for privacy was ripped aside. Light washed red across his squeezed eyelids. Someone spoke into his ear: a harsh and familiar voice, the voice of his brother, Captain Achilles.

"Rise and shine, Davee, you unrecyclable piece of shit! Time to go to work!"

Echo was eighteen, the median age for techs. He had been working since age twelve; only his eldest brother still used his birthname. Captain Achilles had five years on him, a grizzled veteran who had survived two skirmishes with patrols from the Copernicus Alliance. He had been a bully when both of them were being raised by their dam, and was a bully still. He pulled Echo out of his bunk into the freezing dark of the dorm, told him to leave his boots because there was no time to put them on, and to leave the rest of his stuff as well.

Captain Achilles was bulked out by an armored p-suit with a chameleon paint-job, its helmet hung from the utility belt. Echo was wearing only thin underalls, and, because it was the middle of the long lunar night, power in the dorms was strictly rationed. It was easily ten below freezing; the cold of the floor scorched the tender soles of his bare feet. Echo said, between clenched teeth, "You fucker!" and was rewarded with a cuff to the back of his head.

"I got you a prime job," Captain Achilles said, pushing Echo ahead of him between tiered bunks. He was a very tall man, with close-cropped hair and a long thin face whose pronounced chin always looked swarthy. He added, with calculated nastiness, "You're going to love it."

Echo knew that Captain Achilles was crazy. All soldiers were stone-cold crazy. It was the price of eternal pumped-hard vigilance, overdoses of testosterone and steroids, and the combat programs in their heads. Since they weren't yet officially at war, this had to be some deeply dangerous badass mission, just the kind of thing a soldier would love. He said, "Oh shit. You *bastard*. You're putting me on the front line!"

"You techs are all the same. Sniveling worms with no guts."

"You mean, no backbones," Echo said, which earned him another cuff. By now, they were bouncing along narrow corridors lit only by red emergency lights, as if Echo were a virus being chased down a capillary by an implacable leukocyte. The cuff drove Echo full-length to the floor. He ricocheted back up, and, before he could wipe his bloody nose, was caught at the back of the neck by Captain Achilles and pushed on.

"You will do your job and you will do it well," Captain Achilles said, "and you will do it without smart chat or asking damn fool questions. I'll make the family proud of you yet."

"They'll weep crocodile tears and forget me as soon as I've been recycled."

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"Survive this, you'll be a hero. You owe me big, little brother. Just for once, you'll be doing a real man's job!"

"C-can I at least ask if we are at war?"

"Not yet. Soon. We've already pulled a move on that pirate's nest of slant-eyes and traitors, and if we're lucky, they'll try to retaliate. *Then* we'll be at war. Meanwhile, Davee, *you've* been selected for special duties!"

A phrase that jammed an icicle in Echo's heart. Soldiers loved special duties. It meant high danger and almost certain death. It was the one thing that techs tried to avoid at all costs. He said, "Let me guess. We've taken Little Tokyo from the Copernicus Alliance."

"Who told you that?"

"I worked it out just this minute."

"Yeah?" Captain Achilles clearly didn't believe this. "You're in the army now, bro. No need to think."

Echo said, "Thinking is what I do. That's why I'm a tech. I'm right, aren't I?"

"We took it fifty hours ago, and secured the perimeter. It's ours, bro. There's stuff they missed, and that's why worms like you are needed. This is a chance to make the family look good, Davee boy. A chance to redeem yourself!"

"I'm needed for defense work. That's more important than some special op."

"I know what you were working on. Those old pop-up radar-guided missiles? Last-ditch stuff we will never need, because we are strong and we will keep the enemy far below the horizon at all times. This is *special,* bro—this will make you famous."

Captain Achilles shoved Echo through a pressure curtain into the brilliant glare of a staging lock. It was almost completely filled with a dozen soldiers in p-suits, and the coffin-shaped metal boxes which contained their gear. The soldiers all gave Echo the cold eye, as if wondering exactly what his guts might look like, and where would be the best place to draw them out. This was the Greek crew, Captain Achilles' command, with names like Perseus, Andromeda, Jason, and Alexander stitched to the breasts of their p-suits. Most likely, they were already running their combat programs, and Echo tried to avoid making eye contact as, cold and miserable, he climbed into his borrowed suit. It was ill-fitting, the extension joints at elbows and knees loose and baggy, and it stank. The left knee joint was stiff, and gave him a comical limp; the helmet visor was scuffed, and half the functions were redlined.

Echo hooked up his backpack, and followed the soldiers through the airlock into a bus. Captain Achilles sat beside him, slipped him a tube of fish paste, and whispered harshly, "You're replacing a casualty on the tech team out there. Don't fuck up, and you'll make me proud."

Echo sucked down paste and spluttered, "What kind of casualty?"

"The bitch went crazy. Tried to kill a couple of my men. Can you believe that? They iced her ass straight away, of course."

"Of course they did. It's what soldiers do."

Captain Achilles thrust his face close to Echo's. His eyes were bloodshot; he reeked of male aggression. A hectic butterfly rash from steroid overdose stippled his nose and cheeks. He grinned and said, "You better believe it, little bro."

Echo could feel his cells bloom gratefully as the protein in the fishpaste began to enter his starved system. It was laced with testosterone and

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steroids and estrogen suppressant, all going straight to work on him too. He had squeezed the plastic tube flat; now, he unzipped the seam with a thumbnail and licked up the last smears of paste.

Captain Achilles, watching in disgust, said, "Don't they feed you in your nasty little warren?"

"Of course not. Soldiers get all the real food."

"We need it to keep strong and fit."

"And stupid. I bet your people didn't even try to find out why that poor tech went crazy before they iced her."

Captain Achilles gave Echo a tab. "That's *your* job, bro. Stay sharp and do good work, and maybe you'll get back in one piece."

The tab, high-grade military-issue meth, was kicking in when the bus boosted with a bone-deep roar and bruising acceleration. The meth gave everything a harsh, heightened edge, and Echo's thoughts tumbled like a rain of razor blades. His p-suit couldn't access the bus's video system, but he was right in the back of the cargo tube, and, by pulling his harness to its full extension, he could lean over and look out the scratched port.

The full Earth hung in the black sky, white as a sunblinded eye, bright enough to cast shadows across the heavily cratered terrain that was unraveling below the bus's keel. Echo activated the scope on the suit's TV system, and was rewarded with a fuzzy, upside-down view of Earth's ice-covered disc. He could just make out the belt of volcanoes along the equator, tiny blotches against a uniform white so blinding it was like staring at the sun.

Fifty years ago, a robot probe, the last sent from the Moon to Earth, had determined that bacteria and algae were still living around the volcanoes, in hot springs and in water trapped under fresh lava fields. Apart from a few species clinging to deep-sea hydrothermal vents, this was the only surviving life on Earth. Humanity's survival on the Moon was just as precarious. When the sun's luminescence had began to decline, and ice had spread toward the equator from the north and south poles, reviving old space flight technologies had taken second place to fighting for dwindling habitable territory. Grandiose plans to crash comets into the atmosphere and raise the carbon dioxide partial pressure to stimulate greenhouse warming had come to nothing.

In the end, only a few thousand people had escaped the great winter. Those in the Yankee Mars base had died out within thirty years, and for two centuries, the two dozen bases on the Moon had fought savage wars over dwindling resources. Now, after the Copernicus Alliance had destroyed Little Tokyo, the last humans alive were in two bitterly opposed bases, one at the South Pole, the other buried deep below the surface of Mare Insularum. Enriched by the biomass looted from Little Tokyo, the Copernicus Alliance would be urging its population to make babies, and would turn those babies into hardwired warriors. In less than ten years, they would be ready to begin a final war against South Pole—so South Pole would have to strike first. Of course, soldiers had never needed an excuse to go to war. It was what they were programmed to do.

Echo soon tired of staring at Earth, and withdrew into his own reveries. Despite the blast of meth, he actually fell asleep, and woke only when the bus blew its retrojets and more-or-less crash-landed near the wreckage of Little Tokyo. All flights were like this: fast and low to escape any autonomous missiles the enemy might have managed to plant.

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Captain Achilles kicked Echo to his feet, ordered him to pull on his gloves and fasten his helmet, kicked him through the bus's airlock. Like all bases, Little Tokyo had buried itself deep underground, beneath rubble berms and heavy slabs of concrete, but the Copernicus Alliance's burrowing warheads had blown it open like so many hammers smashing into a clam shell. Bits of blackened concrete were strewn for kilometers across the trampled and blasted moonscape. There were pits everywhere, brimful of inky shadows, and the raw scars left by the strip-mining equipment that had pulled out every kilogram of steel from the reinforced concrete and ripped up the solar farm and the greenhouses. The entire population had been killed, either in the bombardment or in the desperate hand-to-hand fighting afterward, and the corpses had been rendered for their organics on the spot.

The Alliance had completely withdrawn from the wrecked and looted base sixty hours ago, leaving only boobytraps for the scouting party from South Pole to deal with.

"We probably haven't found them all, so watch where you walk," Captain Achilles said, as he manhandled Echo toward a rover where two soldiers were waiting for them. "I don't want to have to go back and find another tech to take your place."

"I appreciate the sentiment. If the base has been stripped, why am I here?"

"Those sons-of-bitches didn't find everything. Get in."

As soon as Echo had clambered into the back of the rover beside his brother, it accelerated down a ramp of compacted soil into a wide cut-and-cover tunnel. They drove recklessly fast, in complete darkness. From his p-suit's GPS, Echo estimated that they had gone twenty kilometers when the headlights and brakes kicked on simultaneously and the rover slewed to a halt in front of a standard airlock that protruded from a rubble wall.

Echo was shoved inside by the two soldiers and Captain Achilles, and they all cycled through into normal pressure and a chilly but survivable, temperature. Menaced by the soldiers' assault rifles, Echo was ordered to strip off his p-suit. Shivering, his nose itching from the wet-ash smell of moondust, Echo was pinioned by a soldier while Captain Achilles used a pressure gun to blast a capsule under his skin.

"You're going to find out what they're doing down there," Captain Achilles said. His voice was rendered flat and metallic by his p-suit's external speaker; his face was barely visible behind his gold-filmed visor. "Once you're done, pinch the capsule hard; that will activate the radio transmitter."

"Why don't you go down there yourself?"

"Because they'd attack us and we'd have to kill them," Captain Achilles said. "And we don't want them dead because they haven't finished work yet."

Echo tried to smile, although he knew it must look hideously false. "You're scared, aren't you? Scared of techs. You don't understand what we do."

"The people down there have gone crazy. That's why we don't understand them. My advice is that you don't go crazy too."

The soldier who was holding Echo turned him around and shoved him into a bucket elevator strung on a jury-rigged winch. Captain Achilles said, "Work good, bro. Be a man. Do our family proud," and thumbed a fat red button at the end of a hanging cable.

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The winch hummed, and the bucket fell into a narrow shaft toward a promise of light far below.

It fell a long way: at least a kilometer. Echo's ears popped twice, adjusting to the increase in air pressure. It grew noticeably warmer; still below freezing, but no longer dangerously so. Echo was beginning to think that he might at least live through the ride, when the elevator dropped into a huge chamber.

It was a deep cylindrical excavation, with what looked like a missile or chimney rising from the rubble floor and reaching all the way to the roof. There were banks of blazing lights, and the bare rock walls had been sealed at tremendous expense with spray-on construction polymer. The missile tube or chimney or pillar—perhaps it was some kind of huge hydraulic ram, Echo thought—was shiny black, and scratched and hatched all over, as if attacked by a gang of graffiti artists armed with jackhammers. It was rooted in a jumble of raw rock, with bits of kit—cylinders of polymer mix, ration packs and water kegs, a microwave, a recycling toilet—scattered around. Scaffolding rose up around it, clever, lightweight plastic stuff that constantly shifted and shivered, balancing out the load of the four people who were climbing down to meet Echo, casting vast and absurd shadows on the polymer-sprayed walls.

There were just four techs working on what they called the Artifact: Basic and Syntax, Slash and Port. Syntax was their leader. She explained that it was their mission to understand what the Artifact was trying to tell them.

Echo craned to stare up the dizzying perspective of the pillar's glistening black length. It was clad in some kind of seamless stone coat, and radiated an evil cold; he had burnt his hand when he had touched its flank. He said, "You're trying to figure out how it works?"

"In a way," Syntax said. She was a grizzled oldster of forty-odd years, almost bald, her face scarred where cancers had been removed, steel plates instead of teeth showing when she cracked a smile. Like the others, she had the shiny-eyed look of someone who has spent far too long on meth. "The marks dug into its surface are code. We're reading it, piece by piece."

"It's a message," one of the other techs said.

Echo laughed. "Like a time capsule? Why would Little Tokyo go to all the expense of burying a time capsule?"

Syntax said, "Little Tokyo didn't make it; they found it. It's a time capsule all right, from the very deep past."

"You mean the American Empire?"

Syntax flashed her steel teeth. "Hardly. As near as we can tell, it's seven hundred million years old!"

After a scout patrol had discovered the entrance to the tunnel, Syntax's small crew of techs had been hijacked from the library and put to work on the Artifact. They were all wired with meth so they could work twenty hours a day, snatching sleep when they fell from exhaustion, sucking food from cold packs while they worked. One woman had gone bugfuck crazy and had jumped on the bucket elevator after it had brought down a case of rations; it had come right back down with her bullet-riddled body, and the others had buried her at the base of the Artifact.

None of the techs trusted Echo, because he was so obviously a spy. He didn't blame them. He knew that if he didn't readily give up whatever he

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learned here it would be tortured out of him by his brother. The other techs were even more cynical about their fates. They believed that once they had finished translating the Artifact, they would all be killed.

"Like Egyptian slaves who constructed the tombs of pharaohs," Syntax told Echo. "Soldiers don't think that techs are human. They'll kill us and bury us all when we're done, so we can't squawk about what we've discovered."

She set him to translating a huge block of glyphs carved high up on the Artifact. Her crew had already worked out that the strings of dots and dashes carved deep in the black granite column were binary code, but no one would tell Echo whether they had translated any of it, or what they had found.

He quickly became as obsessed as the others. All techs loved crypto—it tickled their math programs. Echo worked until he dropped from exhaustion, ate only when the pain in his stomach cut through his focused concentration. The cold bone-dry air sucked moisture from his skin, and although he was constantly sipping from a bladder of distilled water, his mouth felt as if it had been packed with salt. His world shrank to the problem at hand. He hardly noticed the other techs, working away on their separate projects above and below him like monks in isolated carrels. When Port and Slash had a fight over use of one of the computers, he watched for a few minutes and went back to work as soon as Syntax swarmed down to break it up.

Echo took pics of every square centimeter of the glyphs, loaded them into one of the disposable computers, ran dozens of decryption programs, started writing his own when nothing out of the box cracked the code. He began to think that he had been given a piece of junk info to keep him harmlessly busy, but there was also a nagging sense that he was missing something familiar and obvious.

On one of his food breaks, he noticed that Basic, the youngest of the techs, was picking about amongst the rubble at the base of the Artifact, catching and zapping the tiny motile cameras that the soldiers used to spy on them. Echo joined in, taking pleasure in outsmarting the cameras' hardwired cockroach evasion routines. After a while, Basic said that she was only doing it because it helped her think. Even if they got all the cameras, the soldiers would just send down more.

Echo smiled, tasting blood as his dry lips cracked. "Maybe there's a better way. You got any construction polymer kit left?"

His voice was a rusty croak; he hadn't spoken since Syntax had showed him where to start work—more than thirty hours ago. He wondered if the war with the Copernicus Alliance had begun. Somehow, it didn't seem to matter.

The girl shrugged. "Sure, I guess."

Basic would be pretty, Echo thought, if she was given a couple of baths and about a month's sleep and another month on a proper diet, if her stringy hair was washed and cut, and the sores on her face treated. Techs weren't allowed to have children—that was the prerogative of successful soldiers—but there were plenty of unofficial marriages amongst them. For the first time, he was aware that he stank like a goat, that his underalls clung greasily to his greasy skin.

He said, "There's this neat trick I know. Want to help?"

He showed Basic how to mix up the ingredients of construction polymer in proportions that were radically different from the instructions. Sprayed onto the plastic liner of the crypt, the stuff stayed sticky, a trap for the roving cameras. Then he and Basic went on a serious bug hunt, and the other

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techs joined in. When the soldiers realized what was happening, more cameras were sent crawling down the walls, but these were trapped in the wide sticky band of polymer. Then the soldiers tried dropping cameras, but the five techs methodically stomped or zapped the hapless critters before they could find shelter. After that, a few cameras were lowered on diamond thread, but any that were dropped too low could be zapped, and the rest were too high up to be able to see much.

After the great bug hunt, the other techs still maintained a frosty politeness toward Echo, but they relaxed their rule about discussing their work. Sometimes they even talked to each other instead of using their covert librarian finger language, and Echo (who knew the basics of finger language, but couldn't follow their practiced, high-speed flurries) began to pick up clues about the Artifact.

It was a chunk of basaltic granite that had been shaped by some high temperature process that had fused its exterior to a glassy sheen as hard as diamond. A mining team from Little Tokyo had found it by accident, while digging for the remnants of an iron meteorite. After Little Tokyo had been overrun, the Copernicus Alliance had either failed to find the Artifact, or hadn't realized what it was. Since most of the Alliance's population were soldiers, the latter was most likely.

Hundreds of thousands of glyph strings had been cut into the Artifact's surface. The shortest ones had been deciphered—basic stuff about Earth and the Solar System, biochemistry, fundamental mathematical principles. There were pictures, too, decoding into one hundred ninety-two by one hundred ninety-two pixel grids. Echo persuaded Slash, a dour young man with a badly scarred bald head, to show him a map extracted from one patch of code, although it didn't look like any map of Earth Echo had ever seen.

"That's how it was back then," Slash said. "All the continents were lined up in this single band along the equator. It confirms the dating we got from thermoluminescence and radon decay."

Echo was struck with a sideways bit of associational logic. "Show me where you got this from," he said.

An hour later, he had cracked the chunk of code he had been assigned.

It was a movie, highly compressed by pasting every bit of non-moving background into each frame instead of generating fresh code, and recycling common motion elements from a palette stuck at the front end, mixed up with instructions on polygon types, greyscales, and scan rates.

It ran for just under a minute, black and white, fourteen frames a second, one hundred ninety-two scan lines, as low-rez as stone age TV. Echo looped it and played it over and over. He fell asleep with it still playing, woke to find the other techs watching it raptly.

It showed a thing like a half-squashed crab built out of bubblewrap sidling up to the camera, slowly turning on a fringe of tiny legs. At what might be its front end was a bug face above a rack of crushing and chiseling and biting mouthparts like an organic Swiss army knife; the camera or whatever had taken the movie zoomed jerkily in on the mouthparts at the end, as if their frantic twitching was significant.

"There's your alien," Echo said.

"It isn't an alien," Basic said abstractedly, pushing greasy hair away from her eyes as she leaned in, watching the loop start over. "Look at that recycled critter dance."

"It doesn't seem to have eyes," Echo said.

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Slash tapped the screen of Echo's computer. "There are apertures all around the rim of the shell. Like pinhole cameras. We have the gross morphology of the boogers from other chunks of code."

"Just stills," Port said, giving Echo a challenging look. He was a rangy fellow with a wolfish look, pale as a ghost, long wispy hairs at the corners of his mouth. "Stills and diagrams."

Echo said, "I'm not pissed. I know you held stuff back from me, and I would have done the same in your place. So you call these things boogers?"

The other four techs looked at each other. Syntax said, "There have to be dozens of loops like this in the code. You did good, Echo."

"I didn't think it would look like a crab," Echo said.

"It doesn't," Slash said. "Not exactly."

"Well," Echo insisted, "it isn't a very alien-looking alien."

The other four techs looked at each other again.

Echo said, "I'm not getting out of here alive, right? I might as well know what I'm gonna die for."

Syntax said, "It isn't exactly an alien. It came from Earth, just like us. It seems that everyone got the history of life on Earth wrong."

Syntax did most of the explaining, with the others chipping in now and then.

The great winter was not the first time Earth had been covered in ice. There had been another great winter seven hundred million years ago, caused by an accident of geology rather than a dip in the sun's luminescence. Breakup of the Earth's only landmass at that time, a vast equatorial supercontinent, had exposed huge areas of what had been interior desert to oceanic rainfall, and chemical weathering of the exposed rocks had locked atmospheric carbon dioxide into carbonates. The catastrophic drop in carbon dioxide partial pressure had meant that less infrared radiation was trapped by Earth's atmosphere. As the mean global temperature fell, ice had begun to spread outward from the poles, and because ice reflected sunlight, there had been a runaway, unstoppable feedback, ice spreading south and north across open water and reflecting back more sunlight, which cooled the Earth so that the ice could spread some more. In only a few decades, the whole Earth had been covered in ice, and all higher forms of life had been wiped out, including the boogers and their nascent civilization.

Because there was no rainfall and no weathering of rocks, carbon dioxide released by volcanoes had slowly built up in the atmosphere. At last, after millions of years, the equator had warmed enough to begin to melt the ice, allowing water vapor back into the atmosphere. And because water vapor is even better at trapping infrared radiation than carbon dioxide, the global temperature had quickly risen to forty or fifty degrees Centigrade, generating vast hyperhurricanes and continent-sized storms of acidic rain, which had rapidly weathered newly exposed rocks and removed excess carbon dioxide, cooling the Earth and allowing life to flourish once more.

And evolution had begun all over again.

"It was always thought that it took three and a half billion years of evolution before multicellular life arose," Syntax said, "and another half billion years to evolve intelligence. But there was an entire multicellular evolutionary epoch *before* our own, wiped out by a great winter whose end was the trigger that started our own epoch. Wiped out so thoroughly that not even a fossil was found. The glaciers scraped at least fifty meters of rock from the surface of the land, and acidic rain eroded at least as much again."

"No animals with backbones or carbonate shells seemed to have evolved

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during the boogers' epoch," Basic said. "Only soft-bodied animals that rarely fossilize. The boogers' shells were made up of millions of cells of pneumatically inflated cellose film."

Slash said, "The boogers' epoch was probably started by the end of a previous great winter, coincident with the appearance of oxygen-evolving photosynthesis. There were at least five cycles of great winters and acidic hothouses. There might have been two or three evolutionary epochs while Earth's atmosphere was still mostly methane."

"Unlikely," Port said. "Biochemistry adapted to reducing atmospheres is too low-energy for multicellular life."

"Life that we *know* about," Slash said sharply, obviously reiterating an old argument.

Syntax hushed them, and told Echo, "The boogers developed spaceflight once their great winter started. In only ten years or so, they were more advanced than we ever were."

"But they died out," Echo said.

Syntax nodded. "They left the Artifact as a monument to their epoch. There are maps on it that suggest that there are dozens of other Artifacts on the Moon, but I doubt that they're any more than copies of this one."

Basic said, "The boogers accepted their fate. Only single-celled bacteria and algae survived their great winter. Those were our ancestors. Everything else died out."

"Except maybe the Ediacara," Port said.

"We can never prove that," Slash said.

Port told Echo, "The Ediacara were this very weird group of multicellular animals that were around just after the end of the Precambrian—at the end of the boogers' great winter. They were nothing like any other known phylum—those evolved later, in the so-called Cambrian explosion that gave birth to every modern multicellular phylum. The Ediacara could be a relic of the boogers' epoch. They could have survived around hydrothermal vents."

"But we'll never know," Slash said.

"And we'll never *not* know either," Port said, glaring at him.

Basic told Echo, "The soldiers wanted us to find records of technology that could be used against the Copernicus Alliance, but there's nothing like that here."

"It's no more than a greeting," Syntax said. "A message sent into the future because there was a chance that intelligent life would evolve again. The boogers didn't think like us. They accepted that life was a precarious thing, able to exist only in those interstices of a planet's history between catastrophic events. They were fatalists."

"I think they were a lot like us," Basic said. "People put messages from Earth on early deep space probes like Pioneer and Voyager. Those were sent into interstellar space rather than the future, but the intention was exactly the same."

"In the end, it doesn't matter," Port told Echo. "We can't get out of here."

"When the soldiers realize that there's nothing useful here, they'll kill us," Slash said, "but they'll let you live."

"Nothing useful?" Echo laughed, and tasted blood from his split lips. "You're thinking like soldiers! I don't blame you. The soldiers took over long ago. We all think like them now, and all we think about is survival."

"You're working for the soldiers," Slash said. "Don't deny it. You're a spy. That's why you were sent here."

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"My brother and sisters are all soldiers," Echo said. "All of them are ashamed that I became a tech, but my oldest brother took it personally. That's why he sent me here. He wanted me to do a soldier's job, because that might make me into a soldier. But once you've been made over into a tech, that's what you are."

Echo tapped his head. "At first, you run the programs, but pretty soon they start running you. It's the same with soldiers. They can't help what they are, because they were made that way—but it's our fault that we let them take over. I looked up the records once. Hardly anyone does that now. We're too focused on the present, on survival. In the last two hundred years the proportion of soldiers increased every time we went to war against another base, and remained at the same level after the war ended, until the next war pushed the proportion even higher. That's why the soldiers are in charge now—but before the wars began, *we* were in charge. We used to set the agenda." He looked around at everyone.

"And you know what? Even now, we're stronger than soldiers. We face up to the truth. We can see what has happened to the human race. As resources decreased, aggression between the bases increased. It was inevitable. We'll fight the Copernicus Alliance, and either they'll beat us or we'll beat them, but in the end, it won't matter who wins. Because after the last battle there will *be* no more resources to grab, and the victorious base will dwindle and die out, or tear itself to pieces in civil war. We'll have lost everything that makes us human. We'll have become as mindless as a nest of ants. We can't survive until the Earth warms again, but we can die with dignity. That's what I've learned here. We'll beat the soldiers, and we'll build our own Artifact. And in half a billion years, perhaps some *new* species will understand what we achieved. What we were."

The other techs were smiling. Echo felt blood heat his face as his sudden passion turned to embarrassment. "Shit," he said, crestfallen. "You already know that."

"We're techs too," Syntax said.

"The woman who died," Echo said. "She wasn't crazy, was she?"

"We drew lots," Port said.

"And she lost."

"No," Syntax said gently. "She won. We knew the soldiers would send down a replacement because we were one person short of a squad. That's how soldiers think. And we knew that they would send down a spy."

"Someone with a way out," Port said.

"Of course, we weren't sure if he would help us," Slash said.

"No, we knew we could get him to help us," Basic said, "because he would be a tech, just like us."

Echo put his hand over the bruise on his forearm, where the capsule had been inserted. "Of course I'll help you. Just tell me what I have to do."

When everything was ready, when everyone was in position and the lights had been turned down, Echo pinched the capsule in his arm. There was a moment of sharp pain as its acid leaked out and created a charge to power the tiny radio transmitter. Echo sat on a cold slab of rock in the semi-darkness, and waited.

An hour passed. Halfway through the second, dozens of diamond wires dropped down almost to the ground, some with the cameras at their ends, some with glaring lights that spun like mad stars. Ten minutes later, the

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bucket elevator came into view high overhead, descending past the black flank of the Artifact. Echo stood up and backed away as it fell toward him.

Captain Achilles swung over the edge of the bucket before it grounded, surprisingly agile considering he was wearing an armored p-suit and toting an assault rifle. His voice blared at full volume through the p-suit's external speaker.

"Where are they? Are they dead?"

Echo raised his hands. He felt very calm, although his heart was beating quickly and lightly. Its rapid pulse tremored in his fingertips. He said, "Not exactly."

Slash and Port stood up behind Captain Achilles, throwing off their dust-covered blankets, raising their hoses. Captain Achilles managed to half-turn before they started to spray him; arms already stuck to his sides, he fell beneath falling sheets of hardening polymer. Echo bounded forward and ripped the antenna from his backpack.

The first part was over.

The five techs, working with feverish haste, blinded the cameras with polymer, loaded kegs of polymer mix into the bucket elevator, packed them with crude gunpowder made from rations charcoaled in the microwave, nitrates from the recycling toilet, and sulfur from a couple of lamp batteries. Slash and Port lashed themselves to the underside of the bucket with strips torn from their underalls, and, with practiced synchronization, Echo pressed the return button in the same moment that Syntax lit the gunpowder-soaked fuse.

The fuse fizzled merrily as the elevator slowly rose toward the slot in the chamber's roof. Echo found that he was counting silently, and wondered if they'd got the fuse length right. It had been difficult to work out how the elevator's travel time would be affected by its load. Too long, and the soldiers would have time to stifle it; too short, and the surprise package would blow prematurely.

He was still counting when the elevator, with the two half-naked men swinging beneath it, vanished into the shadows high above. A minute passed. Echo began to think that it had all gone wrong—and a dull thud shook dust from the roof. He and Syntax and Basic whooped and hugged each other, broke apart when they heard a ragged burst of gunfire.

Silence. Then a body dropped out of the darkness, slammed against the black flank of the Artifact and tumbled down, arms and legs akimbo, landing with a horrible wet broken noise on a slab of rock. It was Port. He had been shot in the chest and face. The three techs were still staring at him when the bucket elevator started back down. Slash was standing on a freeform sculpture of solidified polymer. Only then did they know that they had won.

"We'll kill all of you," Captain Achilles told Echo.

The techs had used solvent to clean hardened polymer from his rifle, and more solvent to free him from his shroud. They had made him shuck his p-suit at gunpoint, and then had tied him up. He lay on the ground in his underalls, arms lashed behind his back, legs drawn up because his ankles were tied to his wrists. He glared up at Echo and said, "Kill me now, bro. Because I mean to kill you."

Echo said, "We'll leave you and the other two here, at the bottom of the shaft, no p-suits, no way of contacting the outside. Just like you left us. The rest of your soldiers will come and find you, sooner or later, and meanwhile you could do worse than study the Artifact, and think about everything I've told you."

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"Those lies aren't worth a second's thought," Captain Achilles said. "How do you know your new friends are coming back? They've left you here with me, Davee boy, because you're a spy."

"They'll be back."

Basic was guarding the soldiers who had been caught like flies in amber when the construction polymer had been blown all over the platform at the top of the shaft. One had managed to half-free his arm in the instant before it solidified around him, and he had shot Port. At first, Slash had wanted to kill the two soldiers for that, but his anger had quickly subsided into sullen determination. Techs weren't killers. He and Syntax had taken the soldiers' p-suits and had driven off in the rover to steal the bus. Syntax had been a mechanic before she had been transferred to the library. She and Slash would fly it in over the top of the chamber, blast into the cut-and-cover tunnel and bring in spare p-suits.

"If they do manage to steal the bus, they'll run away," Captain Achilles said, "but most likely they're already dead. Free me, bro, and I'll save your ass when my people come looking for me."

"They'll come back," Echo said.

"Suppose they do. What will you do if you reach South Pole? Kill all the soldiers?"

"There won't be many soldiers left at South Pole," Echo said. "There's a war on. And if we have to fight, we'll be fighting inside the base, a place techs know better than soldiers. That's what happened at Little Tokyo, isn't it? After its techs found out what the Artifact was for, they rebelled against the soldiers, and the Copernicus Alliance saw its chance and finished them all off. And now the same thing is happening at the Alliance's base, because their techs found out about the Artifact too.

"You thought you could contain us, *bro,* but you were as wrong as all the other soldiers. We're going to tell the other techs all about what we found here, and we're going to ask them whether they want humanity to die out in a futile war, or whether we should work on a suitable memorial instead. You could help. All the soldiers could help. Once the war against the Copernicus Alliance is over, there will be no more enemies to fight, nothing more for you to do. Tell me that you'll think about helping me and I won't leave you here."

Captain Achilles made a tremendous effort and managed to arch his back so he could spit at Echo. He missed, and glared at Echo with a mad, bloodshot eye.

"That's what I thought," Echo said sadly. "Soldiers can't help being soldiers. It's all they can do."

"You're as crazy as the others."

High above, shadows swayed across the flank of the Artifact as the elevator descended toward them. Echo stood up.

"Here come my people," Captain Achilles said. "Last chance to ask for my help, bro."

"I don't think so," Echo said.

"If you're so sure, why are you holding on to the rifle like that?" Captain Achilles laughed. "Suppose you get out of here, suppose you even *get* to South Pole. I bet you don't even know how you're going to get past security."

Basic leaned out of the swaying bucket, waving madly. Echo waved back, and threw the rifle away. "We're techs," he told the soldier. "We'll think of something." O

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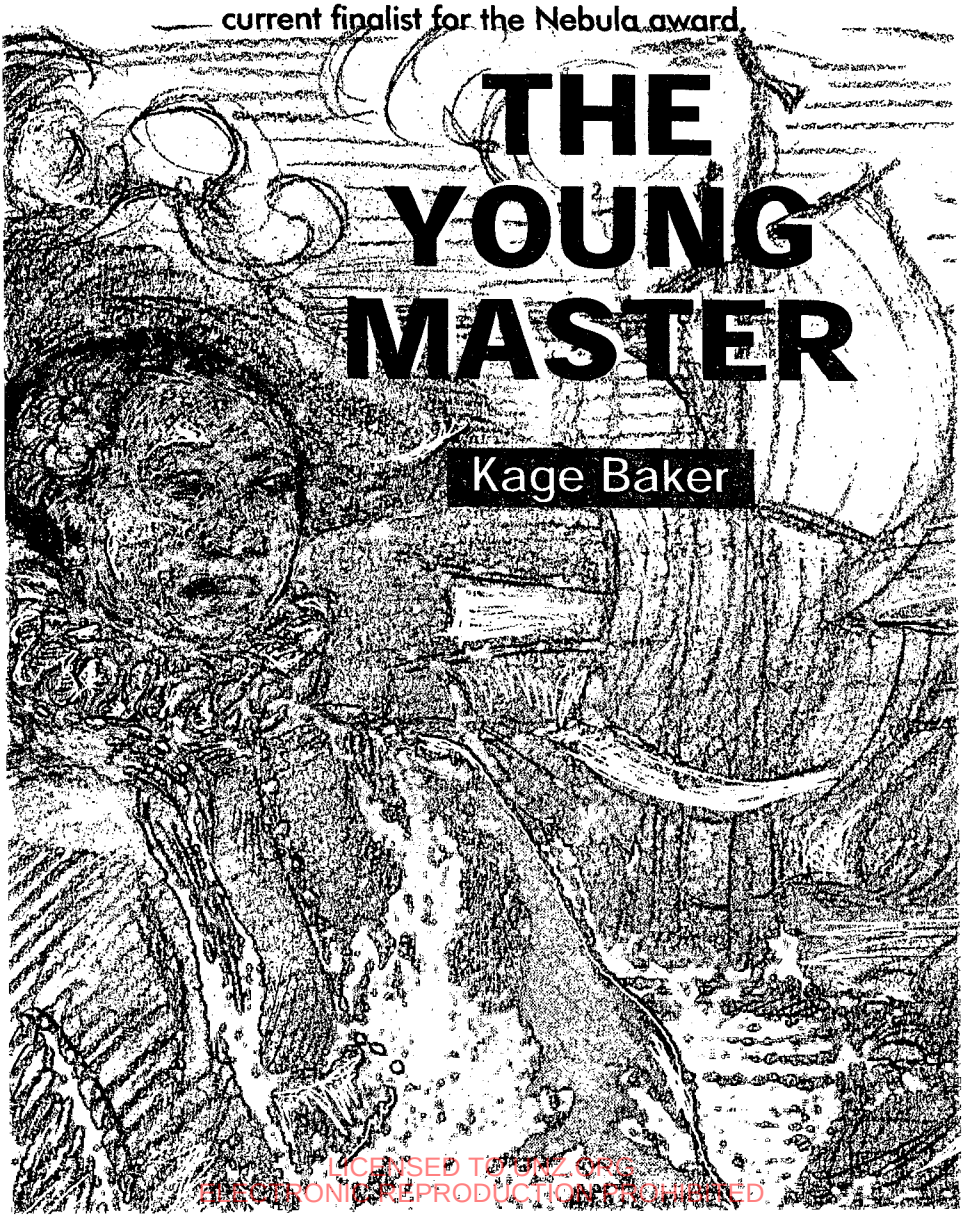
Kage Baker's latest tale continues the adventures of Junior Executive Trainee Latif, who was last seen in the novel *Sky Coyote*. The paperback edition of this book is just out from Eos, and Ms. Baker's entire Company series has recently been optioned by Showtime Entertainment for possible film/television development. One of her most recent stories, "Son Observe the Time" (May 1999), is a current finalist for the Nebula award.



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I was sweeping down my front steps when I first saw him, or rather when he saw me. It's not as though I swept every day! I mean, we had servants like all other respectable households were supposed to; but if you've ever lived in Amsterdam for any long time, or at least in that year 1702, you'll know how hard it is to get the damn servants to actually serve. My God, so touchy! I mean, look at that wetnurse of Rembrandt's, practically sued him for palimony and I know for a fact their relationship was the most innocent you can imagine.

Where was I?

On the steps, sweeping, because Margarite had retired to her bed with the vapors over something, God knows what, probably because Eliphal had been muttering again about the way mortals cook, which I wished he wouldn't do because she's very clean really for a mortal, and as for using too much butter, we were in *Amsterdam* for Christ's sake, not a health spa, and where was she going to get hold of polyunsaturated fats?

See, this is just the sort of domestic calamity our mortal masters failed to foresee when they founded Dr. Zeus Incorporated, though you'd think being up there in the twenty-fourth century would give them a clue. But that Temporal Concordance of theirs only tells them about big things like wars and disasters to be avoided, I guess; they have to rely on us, their faithful immortal cyborgs, to manage the details of business for them here in the past. I know they're all scientific geniuses, to have come up with time travel the way they did, but I can't help thinking they must be a bit lazy.

So anyway I told Margarite, there there dear, you just take the afternoon off, and that was how I came to be out on my front stoop with the broom, in my old black dress with my hair bound up in a dishcloth, which is not really the way an Executive Facilitator wishes to be seen by a prospective Junior Trainee, but there you are.

"I am shocked," observed a tiny little voice, "To behold the beautiful and celebrated Facilitator Van Drouten engaged in drudgery better left to mortals."

I looked down with my mouth open and there he was, standing beside the Herengracht in a pose as arrogant as a captain of the Watch, plumed hat doffed but held on his hip in a lordly sort of way. All along the canal other women were leaning over their stoops to look, because you see a lot of unusual stuff along the canal but not often a tiny little black kid with the poise and self-assurance of a burgomaster.

"Hello, Van Drouten," said Kalugin, who was standing beside him looking sheepish. "I'm afraid we've caught you at rather a bad time."

"Oh! No," I said, when I had got over my surprise. "Minor household crisis, that's all. Goodness, you must be Latif!"

"Charmed, Madam," the child said, and he bowed with the sharpness and precision of—well, of a captain of the Watch, and a sober one at that. "And may I say how much I've been looking forward to the prospect of learning Field Command from one of the unquestioned experts?"

I had to giggle at that, I mean there I was looking at my least executive, but he stiffened perceptibly and I thought: whoops. Dignity was clearly important to him. But, you know, it is to most children.

"Very kind of you to say so, with me such a mess," I said, descending the steps. "And welcome to Eurobase Five. Shall we go inside? I can offer you gentlemen cake and wine, if you've time for a snack, Kalugin?"

"Unfortunately, no," he apologized, taking off his tall fur hat as he ducked

Illustration by June Levine

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through the low kitchen door, which was the one we ordinarily used, and not the grand main entrance.

"Not even for a cup of *chocolate?*" I coaxed. He looked as though he could use a little Theobromos.

"Theobromos on duty?" Latif inquired, looking up at us. "Isn't that prohibited, indulging in Theobromos before nineteen-hundred hours?"

Of course it is, technically, but the young operatives who aren't allowed Theobromos yet have such puritanical attitudes... almost as bad as the mortal masters, on whom it has no effect at all! Our masters were horrified when they discovered that chocolate gets us pleasantly stoned, they thought they'd designed us to be proof against intoxicants. They even tried to forbid it to us, but must have realized they'd have a revolt on their hands, and settled for strictly regulating our use of the stuff. Or trying to, anyway!

"I really can't stay. My ship won't wait," Kalugin told me, with real regret. "But I've got some deliveries—besides young Latif, here—a moment, if you please—"

As he shrugged awkwardly out of his fur coat he transmitted, *And here's the young Executive himself, and good luck with him!*

Oh, dear, is he a brat? He seems like such a polite little boy, I responded, as Latif inspected the Chinese plates ranged along the passage wall.

Polite? Certainly! Even when one doesn't quite meet his particular standards. Kalugin unstrapped the dispatch pouches he'd brought with him. *He graciously agreed to overlook at least four flagrant violations of Company protocols he detected on my ship.*

"Here we are—Diamonds for Eliphal, I believe, they've been rather uncomfortable—and these are the credenza components Diego ordered." Kalugin presented them to me with a slight bow. "Have you anything to go?"

"Not at the moment, thank you." I accepted the pouches.

"Then I must attend to duty." Kalugin put his coat back on. "The young gentleman's luggage will arrive within the hour. Latif, best of luck in your new posting—Van Drouten, I'm desolated to rush but you know how things are—perhaps we can dine at a later date. Have you still got that mortal who works such wonders with herring?"

"Yes, which was why I was sweeping, but I'll tell you next time—" I said, following him as he sidled into the street and put on his tall hat. My goodness, I thought, he *was* in a hurry!

"Now, that's interesting," said Latif thoughtfully, and Kalugin stopped dead.

"What is, young sir?" he asked, and not as though he wanted to.

"I must have missed something. Or am I mistaken in my interpretation of Directive 408-A regarding acknowledgment of delivery of all Class One shipments? I thought the Executive Facilitator of a Company HQ signed for all packets above a certain value."

"Um—" said Kalugin, looking like a trapped bear, but I knew what the problem was now. Latif had been training under Executive Facilitator Labienus, who was a martinet. Not the best influence for a child, even if Labienus is a big cheese. I've never cared for him, personally.

"Except in cases where delivery occurs no fewer than six but no more than twelve times within a calendar year," I told Latif. "And then it's at my discretion whether I sign or not."

"Yes," Kalugin agreed, throwing me a grateful look. "Well. I'll just be going, shall I?"

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"Marine Operations Specialist Kalugin," Latif executed another perfect bow. "*Das Vedanya!*"

"The pleasure was all mine, I assure you," Kalugin called over his shoulder, and was gone down the Herengracht like a shot. Beside me, Latif cleared his throat.

"Insofar as my arrival seems to have been unexpected," he said with beautiful delicacy, "I would be happy to report to my quarters until a more convenient time for my briefing."

"No, no," I told him. "We can chat as I work. So, you've been studying with Labienus at Mackenzie Base?"

"Yes, Madam, for the last eighteen months." He fell into step beside me as I took the deliveries and climbed up into the house.

"Well, that's nice. He's a very efficient administrator, Labienus. Very military, isn't he? Of course, personal styles vary widely," I said, and Latif snorted.

"I've learned that much already. During my first semester I studied under Houbert."

"Ah. I've heard he's . . . a little creative." It was the politest word I could think of.

"Yes, Madam, I would say that's one way to describe him." Latif replied. "In any case, this will be my first experience at a Company HQ actually within a mortal urban community observing field command and interaction with mortals in a situation where cover identities are used."

I nodded, and told him:

"Sounds scary, doesn't it? But, really, you know, it's not that difficult. Especially here in Amsterdam. This is a very civilized town." I lifted my skirts to clear the last step, which is just a little higher than the others, and really I've been meaning to get that fixed, but somehow I never get around to it.

"It's even a boring town, nowadays. I wish you'd been stationed here back in the fifties! I could have taken you around for a sitting with Rembrandt—the Company bought so many of his canvases!—or maybe a chat with Spinoza. We used to buy a lot of his lenses, though of course he had no idea he was grinding them for credenza parts, but he never minded special orders and I used to love to get him talking. . . ."

We had been making our way down the narrow passage, with Latif obliged to stay a bit behind because my skirts were so wide, but when my hoops caught the damn little hall table as they always do he was agile enough to catch the Ming vase before it leapt to its untimely death.

"Nice catch!" I congratulated him, knocking on Eliphal's door. He just stood there gasping with the vase clutched in his arms as Eliphal opened the door and stood peering down at us.

"What?"

"See?" I waved the packet at him. "Diamonds."

"Oh, great!" He took them and looked over his spectacles at Latif. "Who's that?"

"Eliphal, this is little Latif, who's going to be studying with me. He's an Executive Trainee, you know that experimental program where they're sending some neophytes into the field for early hands-on acclimatization?" I explained. "He'll be playing—gee, I guess I can tell people you're my page, would you like to tag along after me when I go shopping and hold my fan and stuff like that? And, Latif, this is Cultural Anthropologist Grade Two

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Eliphal, he's playing a diamond-cutter who rents a room from me. I was just telling him about Spinoza, Eliphal."

"Well, what a little fellow to get such a big assignment!" said Eliphal, leaning down to him like a kindly uncle. "And how old are you, Latif?"

"Five, sir," said Latif coolly, putting down the vase and bowing. "I recently read your dissertation on Manasse ben Israel, and may I say how impressed I was with your insights into the influences at work during his formative years?"

"Uh—thank you." Eliphal straightened up, blinking.

"You're quite welcome."

"Come on, sweetie, let's deliver these. Dinner's at five, Eliphal. So, let's go on upstairs and you can meet Lievens, not the painter of course though he's our Art Conservationist, he's supposedly a cabinetmaker I'm renting to like Eliphal, and so is Diego our Tech, and Johan and Lisette, they're our Botanist and Literature Specialists, they're playing my son and daughter and help me run my business, and then we've got the mortal servants—you've worked with mortals before?—well, ours are very nice though a little temperamental, Margarite and Joost, childless couple, they've got Code Yellow security clearance," I informed Latif as we climbed up to the next floor.

"I see," Latif answered. "Which would mean they actually share residential quarters with us?"

"Yes, in fact their room is next to yours. They don't snore or anything, though," I added, turning to see if Latif was looking upset. Sometimes young operatives are a little afraid of mortals, until they get used to them. I think it's because of the indoctrination we all get when we're being processed for immortality, in the base schools. But, you know, it takes hardly any time before you learn that they're all just people and not so bad really, and I think half of what you learn in school you just sort of have to take with a grain of salt, do you know what I'm saying?

Anyway if Latif was bothered by the idea of living next to mortals he hid it well, because he just shrugged his little shoulders and said:

"How nice. And I understand your cover identity is as a widowed dealer in East Indian commodities?"

"Oh, yes, smell!" I exhorted him, pausing on the landing. I took a good deep sniff myself. "Ahh! Pepper, cloves, cardamom, and nutmeg just now. The whole top floor is warehouse space, you see, and actually I don't just *pose* as a spice merchant, we really do business here. I think I'd have made a great businesswoman if I'd stayed mortal, I really enjoy all those guilders on the account sheet and the exotic bales coming from the ships. It defrays operating costs like you wouldn't believe. There's my first word of advice as a field commander, okay? Always find ways to augment your operating budget, if you want to rise high in the Company ranks."

"Very good, Madam, I'll remember that," Latif was saying, as Johan's door banged open and he came running out in a panic.

"Van Drouten! Van Drouten, what do I do? Kackerlackje's having a seizure!" And he held up the miserable little dog who was having a seizure all right, and I knew why too, the damned thing had been eating paint again, and if I've told Johan once I've told him a dozen times: if he can't watch a pet every minute of the day he shouldn't have one, I think it should be a general rule that cyborgs shouldn't keep pets anyway because they always die after all and it hurts nearly as badly as when a mortal you're fond of dies. Anyway I told him,

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"Take him out in the back and make him vomit! And I'll see if I've got any bicarbonate, all right? But you know, if you'd kept an eye on him like I told you—" but Johan had gone clattering down the stairs out of earshot. I sighed and turned to Latif.

"I think that mutt is trying to commit suicide. Here's another piece of advice: Never let your subordinates keep pets, but if you must, make sure you've got a Zoologist stationed with you who knows how to physic a dog, or you'll wind up doing it."

"I'll remember that too," said Latif, looking appalled.

The mortal with his trunk came after that, so I helped Latif get it up to his room. He insisted on squaring everything away before we went back downstairs, and I had to hide a smile at how finicky-neat he was, all his clothes pressed just so and severely grownup in their cut. He even had a miniature grooming kit in a leather case! Silver-backed brushes and all, he only lacked a razor. Small wonder he looked askance at the toys I'd set out on his bed.

"Sorry about those," I told him. "I wasn't expecting somebody quite so, um, mature."

"It was a charming thought," he said courteously, giving one of his hats a last brush before setting it on a shelf. "And, after all, it does go with the character I'm portraying. I suppose I'll need to observe mortal children to see how they behave, won't I? Certainly all the rest of you seem to be doing a splendid job blending in with the mortal populace."

"Oh, it's easy, really." I assured him. "Easiest part of the job. What's hard is coordinating the actual running of the station."

"I can't wait to observe," he replied, laying out his monogrammed (!!) towel beside the washbasin. "What shall we start with? Duty rosters? Security protocols? Access code transfers? Logistics?"

Was there a little boy in there at all? The machine part was up and running, trust Labienus to see to that; but we work best as whole people, you know, same as the mortals.

"Logistics," I replied. "Want to come watch me get dinner for nine people on the table when the cook's sick?"

I made Erwtensoep because we already had the peas soaking and it's easy. Latif perched on the edge of the table and stared as I chopped leeks and onions, and after a while ventured to say:

"I think I'm getting this, now. This really is total immersion simulation, isn't it? You, uh, really and truly do have to *live* the mortal experience, don't you?"

"Not like a nice Company facility with everything just so, is it?" I smiled at him. "No military command post with precise rules. I know Labienus, he's such a Cyborg! Probably gave you that impression of absolute order, but the truth is that working for the Company is much more like this, like—like—"

"Chaos?" said Latif, and hastened to add: "Except that this is actually Order artfully disguised as Chaos, of course. Isn't it?"

"Sometimes," I told him, pulling out the potato-basket. "See, you have to be so flexible! Like today when Margarite isn't feeling well. And suppose I drew up a strict duty roster and I was all settled down to transmit reports at my credenza according to rules and regulations, like I was just last week,

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and Magdalena, that's the nice mortal girl from next door, dropped in to show off her new baby?"

"That's the Anthropologist's department, I would think," said Latif hopefully.

"Eliphal? Not likely, sweetie. And then, see, while I was sitting there pouring Magdalena and I nice little glasses of gin, there was a pounding on the door and who was it but some poor Facilitator who'd been riding day and night from the Polish front with a dispatch-case of classified material from the king of Sweden he absolutely had to have scanned and transmitted *right then* so he could get it back before anybody'd noticed it was gone? And he had to be fed and given a fresh horse, I might add.

"Fortunately at that point dear little Baby woke up, wanted to be fed, so Magdalena retired to the next room while I apologized and ran the Facilitator back to Diego's room where the document scanner is, left him there to figure out where everything was, it was all so rush-rush I didn't even catch his name, and ran back to bring Magdalena her gin and sit down with her.

"We'd each had time for a sip, and Magdalena was just beginning to tell me about what Susanna over in the Jodenbreestrat told her about the play she saw—and down the stairs came Lievens in a panic to hiss in my ear because he'd run out of stabilizer for the lost Purcell score he was getting ready to seal up in one of his cabinets so it could be rediscovered in A.D. 2217, and he had to have more *right then* because the cabinet was scheduled to be shipped to Scotland in three days. So I had to apologize to Magdalena and ask her to hold that thought, run back to Diego's room and ask the Facilitator to let me edge by him while I transmitted an emergency request to Eurobase One for a drum of stabilizer to be sent by express flight so it could arrive in time.

"Then I had to edge back past the Facilitator and my hoops knocked off his papers where he had them stacked, poor man, and I had to apologize and help him pick them up before I could run back and sit down with Magdalena, and she'd just got to the juicy part of this play—will you hand me that paring knife, dear? Thanks—when there's another knocking on the door!

"*So,* I apologized again, profusely, to Magdalena but fortunately Baby needed a change at this point, so she busied herself with that while I went to see who was at the door, and it was Hayashi from Edobase, standing there on the doorstep in full Japanese costume feeling terribly conspicuous, apparently there'd been an accident with his trunk! And he wanted to know if I could get him a change of clothes and a spare field kit before his ship put out again?

"So I hurried him back through the house and thank God Magdalena didn't look up from Baby's mess or she'd have seen a samurai complete with sword tiptoeing past the doorway! And the only person in the house who had spare clothes Hayashi's size was Eliphal, who was just coming down the stairs on his way out the door to one of those minyan things, but they ran like mad back upstairs and I ran back in to Magdalena, and I needed another gin by this time, I can tell you.

"We'd just leaned down for the first sip when there was Margarite in the doorway; it seemed she'd only just noticed we were out of cooking oil and she was three-quarters ready with the Vleeskroketten she was making for dinner, and wanted to know what she should do?

"Well, of course, what she wanted was for me to go out and buy a jar of oil,

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but I wasn't having any of that, I just tossed her a guilder and said, go down to Hobbema's on the Dam, and she sulked away looking martyred but—"

"Why do you put up with insubordination from a mortal?" Latif inquired with a slight frown.

"Because she prepares fish beautifully, and she's married to Joost, and Joost really is a treasure," I explained. "He's smart, he keeps his mouth shut, and he knows the best places to buy good horses in a hurry without paying a fortune. Sometimes you just have to put up with certain things in mortals, you know? So anyway, I turned back to Magdalena, who had just got to the part of the play where the pirate chief is about to ravish his sister all unknowing, when the front door opened and in came Lisette, all in high spirits because she'd just closed a deal for an unknown early Defoe manuscript.

"In fact she was waving it as she came running in, and went leaping into Diego's room to scan it and collided with the Facilitator, and both their sets of priceless documents went flying everywhere and you never heard such screams!

"So then, Magdalena quite understandably got the impression that my daughter was being assaulted by a Swedish cavalry officer, and—I'm not frightening you, am I, dear?"

"Uh—No! no, not at all!" said Latif, though his eyes were wide and staring.

"Well, the point is, you see how things can get?" I waved the paring knife. "It's hard keeping up the appearance of an ordinary mortal family without alarming the neighbors."

"I suppose so."

"You'll have days like that, too, when you're a full-fledged Executive Facilitator, mark my words." I dumped the last of the potatoes into the soup kettle. "We all do."

"I bet Suleyman doesn't," said Latif.

"Who? Suleyman? North African Section Head Suleyman? Oh, he's a lovely man! You know him?"

"He recruited me," said Latif.

"He was here on business one time—Recruited you? Really? Where?" I dug around in a drawer, wondering what Margarite had done with all the long spoons.

"From a slave ship," said Latif in an offhanded sort of way, and I looked up at him all ready to cry out *You poor baby,* because he was after all such a very small boy sitting there in my kitchen, and how much tinier had he been when Suleyman had rescued him from such a horrible place—but I could tell from the look in his eyes that the last thing he wanted me to do would be to exclaim over him.

At least now I knew why he wanted to grow up so fast. So I just said, "Well, we all get off to a bad start in life, or the Company wouldn't be able to snatch us away from the mortals, I guess. It was plague took my whole family but me; there I was, all alone when the nice immortal lady found me and recruited me for Dr. Zeus." I located the spoon at last and turned to stir the soup. "So, you know Suleyman. He's one of the best, I must say, but he has days when everything goes wrong, too! You just ask him, if you ever run into him again."

"Oh, I will," Latif informed me. "I'm going to be his second-in-command, when I've graduated."

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"Really?" I exclaimed. "How nice! You've already been informed of your assignment?"

"No," he replied imperturbably, "But it's going to happen. I'll make it happen."

Well, I didn't know what to say at that, because, you know—we *don't* make things happen. Oh, we can request assignments, and if we've got the right programming and it suits the Company's purpose, our requests might be granted once in a while—but it's the Company tells us what to do and not the other way around. So I just stirred the soup, and the little boy sat and watched me.

"But enough about me," he said, in that outrageously grownup voice he affected. "Tell me about yourself. Now that I'm getting some idea of what's involved in running an HQ, I'm more than ever impressed by your command abilities! Tell me, how do you like to relax?"

"Well—you know—like anybody does, I guess," I waved my free hand. "Going out, going to the theater, dining, conversation with the mortals."

"You find mortal conversation relaxing?" Latif raised his eyebrows.

"Sometimes," I looked darkly upward in the direction of Margarite's room. "When they're not sulking."

At this point Johan appeared in the doorway again, tears in his eyes, holding out his damn little dog like an offering. Kackerlackje was stiff as a board, lying on his side and foaming at the mouth.

"Van Drouten—the seizures stopped but now he's doing *this*—"

"And after all, immortal conversation can be just as irritating," I explained to Latif, tossing down the spoon and wiping my hands on my apron.

The mutt didn't die; he never did. Within a few days he was up and yapping as loudly as ever, and even seemed to remember a little of his paper-training, which he tended to forget now and then. What a joy to have in the house, huh?

But as it happened, we didn't have to put up with his presence for much longer, because about a week later I got the notification that Johan was being transferred to Brussels. So I gave him a nice farewell dinner party and we saw him off with his suitcase and animal carrier, and Margarite was so happy the dog was going with him she was in a good mood for a week.

And Latif appeared to be fitting in pretty well, which was nice. He followed me everywhere, observing just as he was supposed to. He seemed to have figured out that commenting out loud on their shortcomings made people uncomfortable, and kept his thoughts to himself now. He asked the other operatives intelligent questions about their particular specialties and made a point of sitting with each of them for at least one day, watching as they went about their various businesses, especially Eliphal.

He had no difficulty with the mortals, either. In fact he went out of his way to make friends with Joost, who was charmed by him, and took him along on his horse-trading rounds. It's always a good idea to have a mortal with you when you're in one of their cities for the first time, I think anyway; it helps you see it through their eyes.

When we went out shopping Latif obligingly carried my basket and fan, and put up with all my mortal neighbors who came crowding to stare at him with the excuse that they had some really spicy gossip for me. And I can't think he minded being told what an adorable little fellow he was, or having sugar rolls pressed into his free hand, though the cheek-pinching bothered

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him, but it would bother anybody. People don't remember very well what it's like to be children.

Actually I guess Latif didn't remember much either, as sophisticated as he was. No, that can't be quite true; there was a day when we were out on the Dam and he stared, fascinated, at a black mortal, a slave or servant probably, who was following behind his master. What a mortal he was, too! Gorgeous, with these long legs in thigh-high boots and his full white shirt with its lace collar open at the throat, skin like polished ebony, striding along in good-humored arrogance, chatting with his master about the pistols they were on their way to buy.

He saw Latif staring at him and grinned hugely, such perfect white teeth, and winked. Latif caught his breath, I swear; and all the way home he was walking with the mortal's long-legged stride, practicing that grace.

But that was about the only time I saw him being a little boy, which worried me. The rest of the time he was stone-cold serious and grimly determined to become the perfect operative. I've had trainee Facilitators in their twenties who weren't as dedicated to learning their jobs. But then, Latif was special, wasn't he? Or he'd still have been in the junior class at a Company training base somewhere, with other children his age.

He watched closely as I dealt with the everyday business of running the station: feeding operatives who dropped in at any hour of the day or night, seeing to it they were issued whatever field supplies they needed, and ordering anything we didn't actually have on hand at the station. There was the station budget to fight with, frantically thinking of ways to stretch it until the next fiscal quarter! There were couriers to greet, pouches to be signed for or sent on their way, dispatches to be transmitted; there were shipments to be received and sent of so many humdrum things that would become priceless over time.

Who needed all those copies of the new London *Daily Courant* or the *Moskovskya Viedomosti?* What about all those Watteau and Rigaud paintings, who on earth would want such sickly candy-box things? And the Pachelbel scores that the composer just happened to misplace, or those jottings by Hakuseki, would wealthy collectors really pay small fortunes for those in the Future? It always amazes me, the garbage that time turns into gold; but, you know, that's how the Company makes its money. If it keeps herring on my table (and makes me immortal too!) who am I to raise an eyebrow?

And Latif learned quickly, he really was a brilliant little boy, and grasped very well the importance of interfacing with the mortal community, building relationships within it that we could use to the Company's advantage and reinforcing the illusion that we were a perfectly (well, reasonably) normal mortal Amsterdam family. It helped, too, that I didn't have to keep stopping his lessons to sweep or peel onions.

Yes! Margarite's good mood didn't last past the week of Kackerlackje's departure, but she didn't lapse into her usual pattern of headaches and diarrhea that made her unable to cope with daily routine; she went into a frenzy of activity instead. The house was as spotless as it's ever been, meals were ready on time, and suddenly there was an airy, digestible quality to her cooking that made me realize that maybe it had been just a little heavy before.

Though when Eliphal stopped on the stairs to pay her a gallant compliment about the latest batch of Vleeskroketten, she still glared at him. What

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was going on in her head? No use to ask Joost; when I brought up the subject he just shrugged and held out his hands, gesturing *How should I know?* Then he swung Latif up on his shoulders and they went out to watch ships being unloaded.

Summer ended, and the canals were pretty with drifting yellow leaves for a week or two before the cold set in. I had to order a new wardrobe for Latif, because he'd outgrown the furred jacket he'd brought from Mackenzie base, so quickly was he beginning to shoot up. He was going to be tall and imposing, and I was glad for him. I don't think he'd felt an Executive Facilitator should be short and undignified; but it meant that he prowled around the house for a couple of weeks wrapped in knitted shawls until his new coat arrived.

He was bundled up like that the morning I rose early and came down to find him sitting at my credenza, with his little fingers pattering away at the keyboard rapid-fire-speed.

"Good morning!" he greeted me pleasantly, glancing up. "I woke up early and I couldn't go back to sleep, so I just thought I'd check your mail for you."

"Oh," I said, yawning. "Did I have any?"

"Yes." He indicated a stack of printouts as he closed and shut down the credenza. "The usual things. Answers to queries, priority orders, directives. I've sorted them for you in order of importance. I hope I wasn't presuming?"

"No, no, you need to learn this stuff after all," I replied, sitting down beside him and flipping through the printouts. He really had prioritized them, too, I was quite impressed. "This is great! Gosh, you're a quick study, Latif."

"I'm glad you think so," he replied graciously. "And actually, I was wondering... in view of the rapid progress I'm making, do you suppose it's time I was fast-tracked?"

"Fast-tracked?" I looked up from the printouts to stare at him.

"Accelerated," he explained. "My educational schedule revised to send me on to Eurobase One ahead of schedule. What do you think? Would you be receptive to the idea?"

"Oh, I don't know, sweetie," I told him dubiously. "Shouldn't you have some childhood? I mean, look at you! You've still got your baby teeth, and you're out in the field already! Don't you think you've been fast-tracked enough as it is?"

He watched me intently as I answered him, and I was half afraid he'd get angry; but he just nodded and made a dismissive gesture.

"You're right, of course," he said at once. "I'll bow to your judgment. I'm undoubtedly not yet as proficient at this as I think I am."

And I was so impressed by the gracious way he took my refusal that I hastened to reassure him about what a little genius he was.

Well, I was right about his being a genius.

Snow fell one morning, and froze all the muck so that the view from the parlor window was just like a postcard, and the houses across the canal were all frosted with white. Really it was perfect weather for curling up beside the window with a nice cup of hot chocolate, but we'd run out; everyone had been craving Theobromos desperately lately, for some reason. It was too early in the day to get blitzed anyhow, and I had work to do.

I admired the snowy scene for a few minutes before settling down at my credenza to check my incoming dispatches, sipping my coffee meditatively. I liked this time of the morning, before the rest of the household was awake, when I usually had some peace and quiet.

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The first blast in my little symphony of horror was a communication from Verpoorten in the Brussels office complaining about Johan. Not Johan exactly; Verpoorten said he was an able enough Botanist, though I'd been a little mistaken about what his specialties were when I recommended him for transfer to their Gardens project, and right there warning bells began to ring in my head. I hadn't recommended him! He'd been requested, hadn't he? But I read on, appalled:

It seemed that Kackerlackje was making himself just as inconvenient at Brussels HQ as he had in my house, and Verpoorten was a lot less inclined to cope with him. He had had to give Johan an ultimatum, apparently; the dog had to go. Johan had acquiesced in tears, but only on the condition that dear little Kackerlackje be sent back to me, since Johan knew I loved him as much as he did and moreover had always looked after his precarious health like a loving mother.

Boy, there aren't words to describe my consternation. Some Executive Facilitators I know would just give the little dog all the paint he could eat and then send him diving tied to a rock, but I'm *nice,* you know? I was so upset I put the communication aside without sending a reply and went into my fiscal file. I'd buy something, that would take my mind off my troubles! Time to order new components for the document scanner, yes, Diego had reminded me about that only yesterday, and Lievens wanted another shipment of red oak for cabinets.

What a surprise I got when my credenza informed me I had insufficient funds for the transaction. . . .

Thinking of course that there must be some mistake, I checked my budget balance, and then I got a real surprise.

This has happened to you, right? So you know that after the first frantic denial a sort of icy numbness sets in and you settle down to go over the books with a fine-toothed comb, determined to find the mistake. That's what I was doing when the knock came on the door.

Too much to expect that Margarite would answer it, of course. God forbid she should actually do her job or anything like that. As the knock was repeated a little more loudly I rose to get it, scanning irritably for where in the house Margarite had got to. There was her heartbeat, coming from her bedroom, and some other sounds as well . . . oh, dear, was she throwing up? No wonder she hadn't lit the fires or started breakfast yet. I'd have to do it, of course—

My annoyance at this fled right out of my mind when I opened the door and beheld my two visitors.

Quite an elegant-looking lady and gentleman, as much as you could see of them for the furred coats in which they were bundled up. They were both immortals, too.

"Executive Facilitator Van Drouten, I presume?" inquired the gentleman. "May we have a moment of your time?"

So of course I invited them in off the stoop, and settled them in the parlor while I excused myself a moment and ran off to grab Lisette, who was just coming downstairs, and asked her to go see what the matter was with Margarite, and see if Joost couldn't be prevailed upon to light the fires so we wouldn't all freeze? Then I found a bottle of gin and three glasses and brought them out to my guests.

They were even more elegant out of their coats, quite exotic-looking too, for all that they were dressed in perfect up-to-the-minute Continental fash-

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ions. The man had been Incan or Aztec or one of those originally, he had the copper skin and the gloomy sneering dignity; the lady had white skin, green eyes, hair like a raven's wing, a real stunner if she hadn't had such a disagreeable look on her face. So had the man, actually. But they both smiled politely as I poured them gin and asked how I could help them.

"You're too kind," the man said, hooding his eyes. "May I introduce myself? I am Security Technical Sixteen Turtle and this is my associate, Botanist Smythe. We're presently stationed at New World One."

"My gosh, what a long way to come!" I exclaimed, offering them both their gin. They accepted the glasses but did not drink.

"Oh, we arrived by air transport," Sixteen Turtle said, turning the stem of his glass between his fingers. "We don't expect to be away long." And then he transmitted subvocally: *It's my hope we can resolve this issue quickly, to our mutual satisfaction.*

I didn't know what to make of this, because usually the only time we need to speak to each other subvocally is when we don't want the mortals to hear us speaking out loud, and there were no mortals within earshot. But I gamely transmitted: *Gee, I hope so, too.*

"Amsterdam is truly lovely at this time of year," Smythe told me graciously, though she was looking daggers at me. *May I begin by assuring you that we feel competition is a good thing, generally?*

That's nice, I transmitted back, and out loud I said: "How nice to hear someone say so! Usually all people ever want to see are tulips, tulips, tulips, you know, and of course they don't bloom at this time of year. . . ."

"Yes, I was aware of that," Smythe replied, and I remembered she was a botanist and felt silly.

Competition, transmitted Sixteen Turtle, *can actually stimulate business. And in a global market, there are certainly enough potential customers for everyone.*

What, for tulips? I responded. *My God, don't invest in bulbs! Don't you know what happened last time? The bottom fell out of the market and*—But from their offended expressions I could tell I was off the mark somehow.

Could you come to the point, please? I transmitted, just as Lisette came running back downstairs.

"Van Drouten? I don't think Margarite should get up today—" she blurted, and then noticed I had guests who were glaring at me strangely. "And I'll—just tell you about it later, okay?"

"Please do," I snapped, "and you might suggest to Joost that he deal with her in the meantime."

"He's not here," Lisette informed me, wringing her hands. "He, uh, apparently took Latif out to build a snowman."

"Mortal servants!" Sixteen Turtle shook his head, sounding tolerantly amused. "We have similar troubles with ours."

"At least yours don't sneak out to build snowmen, not in South America," I grumbled, and Lisette took that opportunity to vanish discreetly.

"Oh, we have snow in the mountains," Smythe assured me. *Though not in the plantations of Theobroma cacao. And that, madam, brings us to the point.*

Really?

Yes. Sixteen Turtle lifted his gin and held it under that aristocratic nose of his to inhale the bouquet. *We're quite prepared to tolerate the existence of a rival operation. It's not as though we haven't got an adequate market on the Pacific Rim already, and to be frank, we can't see our operation expand-*

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ing any further. He lowered the glass and fixed me with a cold dead stare. *What we're not prepared to tolerate, however, is gross mismanagement to the extent that the Company is alerted, not only to the existence of your operation, but ours as well.*

At least now I knew why we weren't talking out loud.

"Funny, you know, but I just can't imagine snow that close to the equator," I said cheerily, but now I was looking daggers right back at them. *You're Black Marketeers, aren't you? And you deal in Theobromos!*

Did you think you were the only one to have conceived of this idea? demanded Smythe, but Sixteen Turtle was realizing I really hadn't known what was going on. He lifted his head, peering up our staircase and inhaling deeply, and I did too and suddenly singled out the fragrance that had been driving us all subliminally crazy lately, masked as it was by nutmeg and cloves: Theobromos.

My shock was enough to get through to Smythe, too, and she and Sixteen Turtle looked horrified. They'd just as good as confessed to an Executive Facilitator that they ran a Theobromos racket, and moreover brought her attention to one being run out of her own HQ! Not that I think there's anything wrong with the black market, mind you, since Dr. Zeus never stocks enough Theobromos in the Company bases. But it *is* against Company regulations, and any operative caught at it faces disciplinary measures.

Sixteen Turtle recovered himself first. He smiled broadly and put his fingertips together.

"Ah, but I can certainly imagine your beautiful country ablaze with tulips," he said. *Dear me, I can't imagine this will reflect favorably on your record,* he transmitted. *One of the operatives under your command dealing in contraband Theobromos? And not very well, I might add.*

How not very well? I demanded. *You thought it was my operation, didn't you? You may as well tell me all the details. Has somebody been using my codes to buy the stuff?*

Would it be in our best interests to tell you? Smythe replied, looking as though cocoa butter wouldn't melt in her mouth.

Yes, it would, I told her grimly.

She and Sixteen Turtle looked at each other before he transmitted.

Well, madam, it appears that someone with much audacity but little expertise has recently purchased a great deal of a certain commodity in your name, apparently with the intent of cornering the European black market on that commodity. Nothing to distress anyone in that; as I believe I pointed out, the global market can bear more than one player in this game. However, the player in question has offered his commodity at such absurdly low prices that he or she is certain to arouse suspicion. Moreover, by our calculations, your culprit can't possibly turn a profit! And such practices are not only likely to ruin the individual dealer, they're bad for business generally. This was why we felt obliged to warn you, for your own good—

I remembered my nonexistent budget balance.

I see, I transmitted. I didn't, yet, though. Just at that moment another transmission crackled through the ether, slightly distorted by snow and panic, and unfortunately on a wide enough band so my visitors heard it, too:

Van Drouten! Very angry mortal looking for you! I'm trying to head him off, but—

It was Kalugin, sounding as though he were running along through the frozen streets.

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That was exactly what he was doing, too, because a moment later there was a commotion on the front stoop and we could hear Kalugin saying:

"Sir, I implore you! Whatever your grievances against the man, the City Watch will look dimly on stabbing him in this good lady's parlor—"

"Excuse me, won't you?" I said, leaping up to answer the pounding on my door. When I opened it I beheld Kalugin, or rather his broad back, because he had got in front of my visitor and was holding his hands up in a placatory gesture. The visitor was a diminutive mortal gentleman who was glaring around Kalugin at me with an expression of such venom it made my hair curl.

"Where is the Jew Eliphal?" he demanded.

"Uh—Madam Van Drouten, this gentleman was a passenger on my ship, and he seems to have some grievance against one of your tenants—" Kalugin explained hastily, turning around. The mortal used this opportunity to push under Kalugin's arm and slip past me into the hall, and from there into the parlor.

"Where is the diamond cutter?" he shouted, flinging his cloak back over one shoulder and revealing a box he was clutching, also the sword and matching dagger on his hip. Kalugin and I were both beside him at this point, but unfortunately Eliphal had heard all the commotion and come running downstairs.

"What is it? Who wants to see me?" he asked. The mortal singled him out with a deadly look and hurled the box down so that it bounced open at Eliphal's feet, spilling out three or four bricks of something wrapped in oiled paper. A fragrance rose up from the broken box like, well, like paradise! Something tropical and exotic and yet evocative of cozy winter kitchens where you could curl up by the stove with a nice hot cup of . . .

Theobromos. Not the ordinary stuff mortals bought and sold, either, but the high-powered Company cultivar with a kick like a mule. Every immortal in my increasingly crowded parlor leaned forward involuntarily, including me.

"Where the hell are my emeralds?" the mortal snarled, drawing steel.

Eliphal looked up openmouthed from his contemplation of the spilled delight.

"What emeralds?" he replied. "Who are you, sir?"

"Sanpietro del Vaglio!" the mortal replied, as though it was terribly obvious. "And I tell you to your face you are a liar and a thief and the son of Barbary apes!"

"How DARE you? I've never heard of you in my life!" Eliphal shouted, drawing himself up, and I winced because he takes his character very seriously, but before the mortal could lunge forward with his sword there was yet another clatter of feet on the stoop and in came Joost and Latif, all dusted with snow as though they'd just stepped out of a toy globe. They halted and stared at the scene, astonished.

"Do you dare to deny you offered me six Peruvian emeralds of the finest grade, and sent me *this* instead?" screamed del Vaglio. "What do you think I am, a confectioner?"

Joost's eyes went wide with horror, and so did Latif's. They exchanged a glance. Everybody in the room knew right then, except for the mortal, whose back was turned to them.

"Yes, I deny it!" Eliphal retorted. "Somebody has been using my name to do business!"

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And he turned an accusing stare of terribly righteous wrath on Latif.

Latif met his stare and backed up a pace, unblinking; then he turned and buried his face in my apron, and burst into very, very loud sobs.

Sixteen Turtle and Smythe turned to smirk at each other.

"Mistress, it wasn't his fault!" Joost cried. "I must have sent the parcels to the wrong addresses!"

Latif sobbed even more loudly.

"You mean you were supposed to send emeralds to this man and chocolate to somebody else?" I asked Joost. Del Vaglio had turned to stare at us in incomprehension; Eliphal folded his arms in indignant triumph.

Joost looked abashed. "Yes, Mistress. But—"

"Where did you get six Peruvian emeralds of the finest grade, Latif?" I inquired, so dazed the little details were holding my attention. Latif's sobbing went up a decibel.

"You're that little brat who was training with Houbert, aren't you?" remarked Smythe suddenly, leaning forward to stare at him, or at least at the back of his head. "Ha! You put your tour of duty in New World One to good use, I must say!"

"You mean—" I began, meaning to ask if the child had spent all his free time making smuggling connections, but at that moment somebody else came slinking up on the stoop and peered in through the door, which was still open and in fact snow was floating in.

"Um—excuse me," she murmured, or at least that's what I think she said because she was so muffled up in scarves and fur. "I'm looking for Facilitator Van Drouten. . . ?"

"Well, come in and shut the door after you," I said wearily, but she drew back.

"Um . . . no, I—" Her gaze riveted on the broken box and its fragrant contents.

"Oh!" Light dawned on me. "You got something you didn't expect in the mail, huh?"

She looked as though she was about to turn and run, but Kalugin stepped close and took her arm firmly. He led her outside and they had a whispered conversation; a moment later he returned bearing a small wooden box remarkably like the one del Vaglio had brought.

"I believe this is yours, sir," Kalugin said, offering it to him. Del Vaglio sheathed his sword and took it doubtfully, and Kalugin bent down and swept up the broken box and its contents. "Excuse me a moment, won't you?"

Kalugin took the Theobromos outside and a second later we could hear the immortal, whoever she was, running away as if for dear life. Del Vaglio, meanwhile, had opened the new box and carried it over to the window to inspect its contents. He took out a lens in an eyepiece and examined whatever was in there—six Peruvian emeralds of the finest grade?—pretty carefully before closing the box with a snap and tucking it under his arm in a possessive kind of way.

"Acceptable," he said, and swinging his cloak around him he strode to the door. "Grazie, Captain Kalugin. Under the circumstances I will seek no further redress for this insult."

"What about the insult to *me,* you pig?" roared Eliphal, but del Vaglio exited regally, if hurriedly. At least he shut the door after himself. But the room was no less crowded, because here came Lisette down the steps again at a run, crying out:

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"Joost! You'd better go see Margarite right away!"

"Is she all right?" He looked alarmed. Lisette scowled at the rest of us and came and whispered in his ear. The alarm in his face vanished, he lit up like a chandelier.

"Lord God!!!" he whooped. "It worked!" He rushed at Latif to hug him, but Latif was stuck to my apron like a limpet, still sobbing, so he contented himself with kissing the top of his head and yelling: "God bless you, little master, it'll be a son for sure!" Then he turned and ran away upstairs, and we could hear his feet thundering all the way to the fourth floor.

"So . . . you've been slipping Margarite hormones or something, too?" I guessed. Latif was still too wracked with sobs to reply, which was answer enough. Well! Guess who was going to be lighting the fires and sweeping the stoop for the next few months? Not Margarite, huh? "And I'll bet you got Johan transferred, didn't you?"

Sixteen Turtle and Smythe rose to their feet.

"Perhaps we'd best depart," said Sixteen Turtle in a voice like silk. As he was pulling on his fur his eyes glinted with malevolent humor. *Unless the young gentleman wishes us to take his remaining stock off his hands? Though I'm afraid we couldn't possibly offer more than fifty percent.*

Latif's sobs kept going, but his little fists clenched in the folds of my apron.

"How much . . . merchandise is upstairs, Latif?" I asked him.

"Five hundredweight chests," he paused in his sobbing just long enough to say distinctly.

Kalugin and Eliphal reeled. Well, that just about accounted for the hole in my budget. Joost and Latif must have had it brought in by canal barge and lifted it up with the warehouse block and tackle, possibly while I was out shopping. I don't know where I found the presence of mind to look Sixteen Turtle in the eye and transmit to him:

Nothing doing! I'm confiscating his entire stock. You can deal with me now! And you'll either pay me full retail value or—and I *really* don't know where I found the nerve to say this, *Or maybe I'll go into business for myself! You said you wouldn't mind a little competition. Hmmm! This close to Belgium, I'll bet I could cut into your markets with a vengeance.*

I must have expressed myself badly, replied Sixteen Turtle without batting an eyelash. *Naturally we'd pay full retail value for an order that size. Five hundredweights? Let me think, we could offer . . .*

He conferred briefly and subvocally with Smythe, and then she named a sum. It wasn't quite enough to bring my budget into the black.

What do you think, Latif? I wondered. *Perhaps we could work out a marketing strategy. "If You're Tired of Waiting for Godiva, Wait No More! Primo Black Magic Is Here!" And we can always claim it's fresher and purer than the competition's because it comes in on the Dutch East Indies ships—*

Smythe winced and named another sum. It was a lot higher than the first sum she'd named. Latif cautiously lifted his perfectly dry face from my apron and mouthed *Take it!* in silence, then buried his face again and gave another wail of misery.

"Done," I said aloud. "Who's your banker?"

Eliphal oversaw the transfer of funds and we had the stuff loaded out of the house by that evening.

"So, you see?" I said, dipping my scrubbrush in the soapy water and going

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after the greasy patch in front of the oven. "You weren't ready to be fast-tracked after all."

"You're right, of course," Latif replied gloomily, dipping his scrubbrush too. He put it down a moment to roll up his sleeves again and then attacked a blob of spilled jam. "But it almost worked." *If Joost hadn't mixed those labels and if I'd had a better idea what the black market rate ought to be. . . . You know I was only trying to defray operating expenses and make your job easier, I hope?*

"Oh, yeah," I agreed. "And it might have worked at that, sweetie. But the logic's really simple here: You're a child. You don't know everything about this job yet. That's why you're not in Africa. And aren't you glad that if you were going to make a big boomeranging blunder, you did it in front of me and not your hero Suleyman?"

"I guess so," he replied, edging forward to get some tracked-in mud.

"Or Labienus! Though I can't imagine you'd be having a conversation like this one with *him*," I added, snickering at the idea of Mr. Super-Cyborg Executive Facilitator General on his hands and knees scrubbing a floor. "I guess I must have fallen pretty short of your expectations after you'd studied under Labienus."

"Everybody under his command hates Labienus," Latif told me quietly.

"I'd heard that," I said. "I've heard he treats his mortals like slaves."

Latif nodded. He dipped his brush again and went on scrubbing. After a moment he said: "Labienus never breaks the rules where anybody can see. And . . . he always makes sure there's somebody else to take the blame. But I saw. And I thought . . . well, so much for role models." He scowled down at the rust stain he was attacking. "But Suleyman doesn't do stuff like that. I hope?"

I slopped suds on a crusted bit of something I didn't want to think about—how long since the last time Margarite had scrubbed this floor?!—and said:

"No, Suleyman's a nice guy. You'll see, when you finally get yourself assigned to his HQ. And, you know what? Even with a little setback like this, I'll bet you get your wish. I'll bet you'll be assigned to his command in no time at all, a smooth operator like you."

He actually giggled at that.

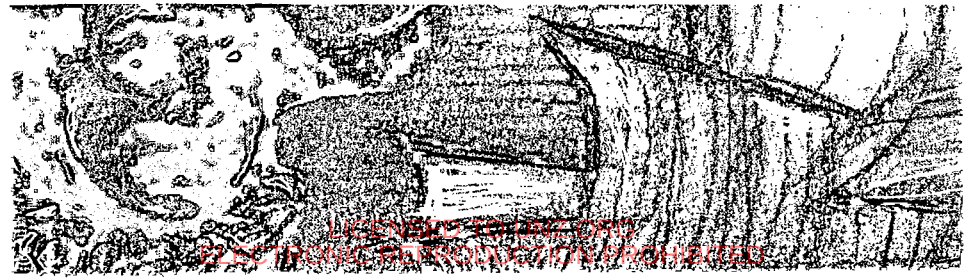
"Though actually I should probably continue on here a while longer," he said, with elaborate casualness.

"So you can learn the finer points of getting dirt up off of a floor, huh?" I panted, sitting up and dropping my brush in the bucket.

"Or something," he replied, dropping his brush in there too. He stood up.

"Good, because you wouldn't believe how much of an Executive Facilitator's job is cleaning up messes," I told him, getting to my feet and surveying what we'd done so far. "Okay! Now we mop and then, what do you say? Want to go shopping on the Dam? I could use some marzipan cakes."

"Me too," Latif replied, slipping his little hand into mine. O



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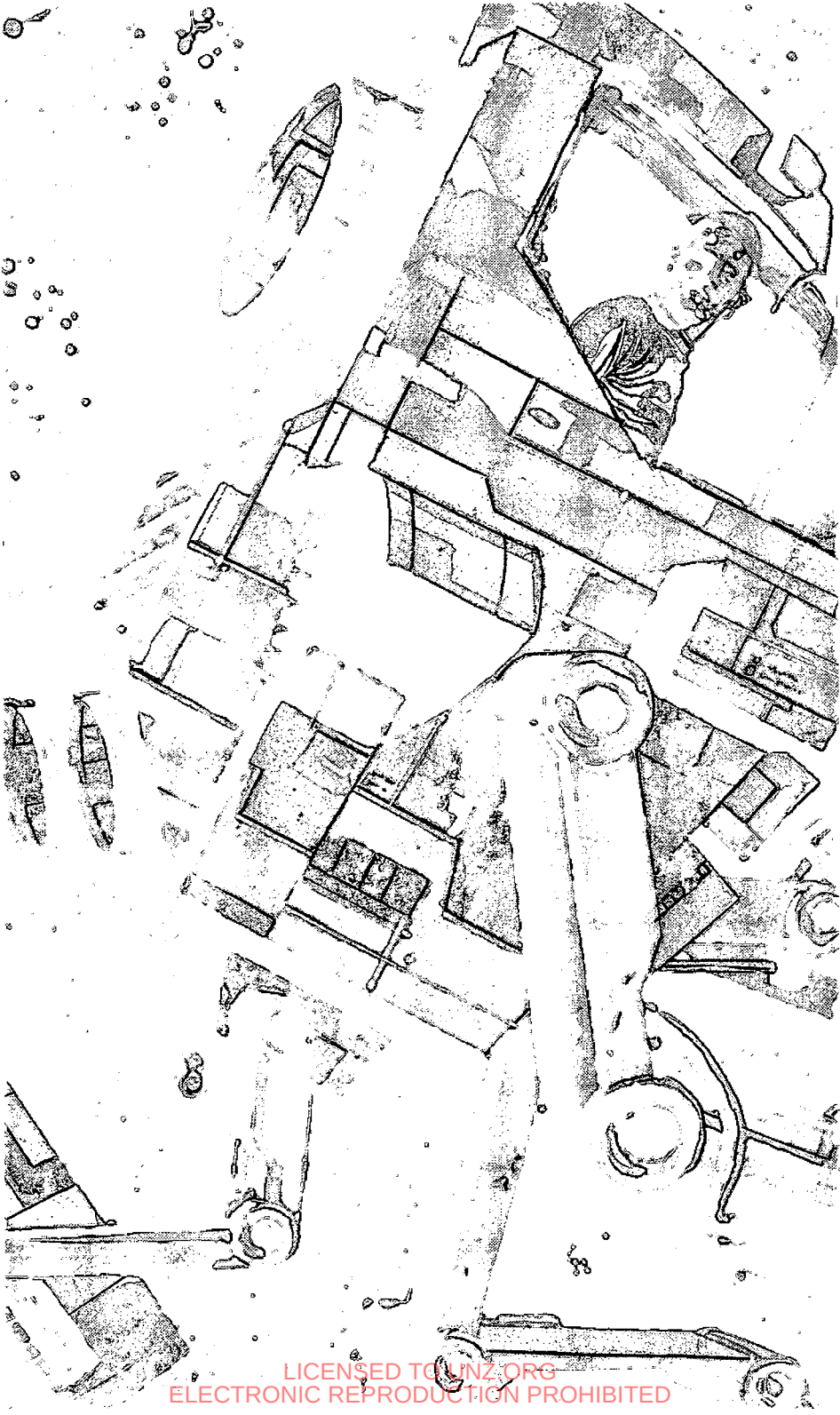

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Matthew Jarpe

Illustration by Mark Evans

With a Ph.D. in biochemistry, Matthew Jarpe spends his days "discovering the molecular mechanisms of autoimmune and other diseases, and finding ways to trick cancer cells into committing suicide" at Biogen—a biotech company in Cambridge, Massachusetts. He lives with his wife, Michelle Morris, and two dogs. Mr. Jarpe has published papers in the *Journal of Biological Chemistry* and other scientific journals. The following story is his first fiction sale.

VASQUEZ ORBITAL SALVAGE AND SATELLITE REPAIR

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Thirteen hours in the jar would be enough to break the will of any man. The jar was small for a space habitat, measuring somewhere between a coffin and an elevator. It wasn't as comfortable as a coffin, or as entertaining as an elevator. Outside was the eager embrace of vacuum. Inside, there wasn't much more than that.

Thirteen hours in the jar would have had the most hard-bitten space captain begging to give up the self-destruct codes to his ship. But for Emilio Vasquez the jar wasn't a torture imposed by some brutal interrogators. It was his job.

Vasquez made most of his money by scooping up junk in orbit around Venus in a wire mesh net attached to the front end of his orbiter, the *Chomper*. On most planets you could make a bit of money doing this, but Venus was young, barely developed, and the junk that orbited this planet was pretty meager. Fixing satellites, on the other hand, could be very profitable, and Vasquez could fix a satellite. So he had this new business idea. He would set the *Chomper* on an orbit around the planet, hoovering up junk as usual, with no one on board. Then Vasquez would go extravehicular in this military surplus repair module, the jar, and fix satellites until the *Chomper* came back around. It was a sweet idea. Only one problem: the jar transformed itself from a vaguely unpleasant and uninteresting can of air into a hellish prison of the mind sometime around hour seven. Had Vasquez known this, he never would have bought the dammed thing. But he was in hock now, so he had to stick with it.

He had a contract to repair the guidance system on a particle beam generator, and he was rushing to finish in order to satisfy a number of time limits that were about to collapse in on him. First, he had to finish in time to rendezvous with the *Chomper*. The rendezvous was two hours away, and he couldn't be late or the jar would run out of battery power while waiting for the ship to swing around on the next fifteen hour orbit.

The second time limit was somebody else's screw up, but that didn't make it any less real or any less of a pain in the ass for Vasquez. The particle beam generator, used to speed up or slow down big ore haulers, was off course and swinging dangerously close to the orbit of the *Ticonderoga,* the warship that policed Venus orbit. If it got too close the trigger happy rent-a-cops on the *Tike* would freak out and might even open fire. Then Vasquez would lose the satellite repair contract and probably his whole business.

The third time limit was just Vasquez's personal hang-up. He was working about five meters from the unshielded isotope battery that powered the particle beam generator's guidance system. He was watching the dosimeter clipped to the front of his shirt pretty carefully. He had clicked over five rems since he'd started, which wasn't too bad for an acute exposure. He might lose a little hair over the next couple of days, or find some blood in his stool, if he cared to look for it. He didn't think too much about the chronic dose. He already had in excess of 200 rems on it, which was pretty normal for a spacer. Good for a significant cancer risk, almost a guarantee that any child he fathered would have some serious mutation, but he'd gathered that dose over years and he'd had time to get used to the idea. He knew he'd be feeling it in the morning if he caught more than ten rems in one shot, so avoiding that was another good reason to hurry it up.

Vasquez paused the waldo in the process of resetting an unseated chip. He pulled his fingers out of the thimbles one by one, then twisted his wrist out of the bracelet, and then wrenched his elbow out of the cup. Finally, he

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used his free hand to scratch madly at his crotch. The vacuum diaper was riding up on him again. He'd be glad to get back to the relative luxury of the *Chomper*. He readjusted the nylon harness that kept him from floating around inside the jar, then reversed the process to get his arm back into the waldo rig.

Like most military surplus items, the jar was not exactly right for this job. It had been made to fit some other purpose and Vasquez was still working on refitting it for his own needs. The engineers who'd designed the thing had given it just four hours of life support, reasoning that not even an idiot would agree to more than four hours in such a confined space. When Vasquez had bought it, he'd immediately refitted the life support for twenty-four hours, to suit his own needs. He didn't care what the engineers thought. He needed something that would keep him alive during an entire orbit, at every level, even up in the high country. That way he could set the *Chomper* on a rich vein of junk while he fixed a satellite in a cleared orbit. He had it all figured out, except for the psychological factor. It turned out the engineers were right about that calculation.

The tool kit on the outside of the jar had items he never thought he'd use, and lacked tools that he needed. It had several sets of waldo hands, ranging in size from the delicate little centimeter-wide pin hands for electronics work to the big, clumsy, and mostly useless meter-wide meat hooks. The chemical engines had too much power, and there were way too many of the small compressed gas thrusters for him to keep track of. He knew what the fiberoptic scope was for, and the laser welding torch, but the green oval screen with the row of useless buttons on the inside wall was still a mystery. It would be a while before he had the jar set up just the way he wanted it.

It looked like he was finished. He powered up the guidance system and watched the start-up procedure. The self diagnostic showed green. The guidance system was back online and the satellite was already moving away from him, parking itself in its own orbit. Almost as if it knew the bastards on the *Ticonderoga* were notoriously jealous guardians of their orbital space. Vasquez got ready to boost the jar back into the path of the *Chomper* so it could snag him as it swept by. Then it was a hot shower, flip on the news and see how the commodities market was doing, and sort through some junk. Better by a damned sight than sweating away in the jar.

Before hitting the engines, Vasquez looked out the windows out of habit, making sure he wasn't boosting into the path of some projectile. The jar didn't have radar. Unless that was what that green screen was for. Up ahead was the bright spark of the *Tike,* coming on fast in opposing orbit. Down planet was the particle beam, still finding its own real estate. The *Chomper* was too small to see, even though it was closer than the *Ticonderoga.* And up in the high country . . .

Something. Vasquez wasn't sure, but he thought he saw Betelgeuse occluded for more than a second. Yes, there it was. It occluded the stars in the belt of Orion, Anilam first, then Mintaka and Alnitak at the same time. The stars stayed dark for well over a second, then all three reappeared at the same time. Something big, or close, or both, and moving fast. There was nothing in the high country that big.

It wasn't an ore hauler. They kept a pretty regular schedule. The resupply ship was a week out, he was quite sure of that. Nobody on Venus missed the arrival of the resupply ship. And it couldn't be a tourist. Venus was a

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pit. There was no reason anyone voluntarily came here. Vasquez was curious. He flipped on his radio to call traffic control on the space station.

"Unidentified vessel, this is Venus security aboard the *Ticonderoga,* please transmit your code and alter course." So, apparently the boys on the *Tike* had caught sight of the bogie and they sounded like they were shitting in their pants. "Unidentified vessel, you must alter course. . . . Unidentified vessel, your current heading is in violation of Venus orbital priorities, alter course for high parking orbit and identify at once."

The voice on the radio changed. Someone had gotten the boss. "Unidentified vessel, this is Venus security. You are encroaching on protected Venus space. Alter course or prepare to be fired upon."

What happened next made Vasquez jerk back so he missed seeing it directly. A burst of static so intense it sounded like an explosion came over the radio. A burst of light streamed through the window. He pulled himself back to the window in time to see the glowing embers of what was left of the *Ticonderoga* spreading out in an asymmetrical cloud.

"Unidentified vessel, you dirty bastard," Vasquez whispered.

For the next few hours, Vasquez knew only stark terror. The unidentified never spoke over the radio, but Vasquez heard the crews of the ore haulers jabbering away until, one by one, they were blasted just like the *Ticonderoga* had been. He watched on in helpless horror as the space station, with a couple of hundred men, women, and even a few children, was blown up.

Then it was *Chomper*'s turn. The little orbiter was running quiet, not jabbering away on the radio, not firing any boosters, just drifting in orbit and catching the occasional piece of garbage in its net. But it was sending out a transponder signal, and it was burning a little plutonium in its reactor. So the unidentified lit it up. Vasquez never saw the shot, whether it was a missile or an energy beam or just a depleted uranium slug. Whatever it was, it made short work of *Chomper*. Just a little static burp and a dim red cloud of debris, and that was the end.

Vasquez finally saw the enemy when it passed between him and the planet. It was a warship, of course. Much newer than the decommissioned *Ticonderoga,* wedge shaped, and dead black, to better radiate heat. And it moved like nothing he'd ever seen. It reversed directions so fast that everyone on board must have been in acceleration tanks filled with silica gel. The enemy ship went into a power dive and swung through two gut-wrenching hyperbolic orbits, looking for more targets. It must be packing one of those magneto-warp engines he'd heard about. No mere reaction drive could move a ship like that.

Next, they went after the particle beam generators, which of course could be used as weapons. That wasn't what they were designed for, but someone like Vasquez could have pointed one of them at the invader and let go with a barrage. He might even scratch the paint. He hadn't thought it was worth trying, but apparently the attacker was worried enough about the possibility to blow up all four of the generators.

As it turned out, it was a good thing that he was clear of the particle beam, because whatever they threw at it made for a hell of a light show. Vasquez felt a tingle that brought tears to his eyes, then a wave of heat as the temperature regulators overloaded, and finally his ears popped as the jar was compressed in the shock wave.

He hung in the center of the jar, trying to catch his breath and blinking

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the spots out of his eyes. He was alive. The particle beam generator had been over a kilometer away when it went off. He didn't see what had hit it any more than he had seen the weapon that had destroyed the *Ticonderoga* or the *Chomper*. But he was sure that whatever it was, it was swinging around to draw a bead on the jar next. He couldn't run, or hide, or fight back. He was still strapped into the harness of the waldo rig, so he couldn't even kiss his own ass goodbye. So he just waited.

And waited for ten minutes more. He heard the static burst of the explosions as the other three particle beam generators went off, then the enemy ship took up a position over the north pole of Venus and just sat there. Not orbiting, not moving. Just using its fancy new engines to hover, right over Cupid, the biggest mining base.

They hadn't seen the jar. It wasn't surprising. The jar was relatively small and didn't put out much radiation in any wavelength. If they had seen him, they would have opened fire, certainly. They'd killed almost everything else in orbit, everything that posed a threat. And, laughable as it was, Vasquez in his little jar with the little hydraulic arms could be considered a threat.

So they had spared the jar as an oversight and had gone right to attacking the planet. Vasquez could see these weapons. Bright sparks fell from the enemy ship toward the yellow cloud cover. Then he saw something he'd never seen before. Something he never thought he would see. He looked down on the unveiled face of Venus herself. Whatever those weapons had been, they were powerful enough to roll back the dense cloud cover over the pole, to expose the surface that hadn't seen direct sunlight in millions of years.

But powerful enough to crack Cupid? Probably not. The weapons would destroy everything on the surface, to be sure. Any miner unlucky enough to be out and about would surely have been crushed by the shock wave, which would carry a lot of force in ninety bars of CO_2. But Cupid was buried underground, under tons of volcanic rock packed with heavy metals. It was the perfect bomb shelter. The mining base was already shielded against blast furnace heat, crushing pressure, acid, electrical storms and earthquakes. What weapon could damage them?

The answer was obvious as Vasquez waited for the barrage to continue. The weapon was time. The shock wave had destroyed the power receiving stations, which had to be up on the surface to catch energy from the power satellites. Without them, Cupid would no longer have the energy to pump heat out of the habitat. As their internal power supplies ran down, they would cook in there, and this little drama would slowly come to an end. Or they might opt for the escape pods and get picked off one by one as they launched themselves into orbit. Either way, Emilio Vasquez would be the only survivor of the attack. He'd have that distinction for just six more hours, because that was when his own batteries would quit, then shortly after that the air scrubber, then Vasquez himself.

If he lasted that long, that was. In order to make it to his date with asphyxiation he first had to orbit through the debris cloud of the *Ticonderoga*. When the attack had started, the jar and the *Tike* were in the same opposing orbit. Most of the debris followed the same path as the ship had been headed, and Vasquez dared not fire up his main engines to move the jar for fear of attracting attention. The cloud would be full of all sorts of nasty twisted metal, not to mention the remains of the rent-a-cops and a big

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chunk of fissionable material from the reactor. He didn't want to add a dangerous radiation exposure to the perils he already faced. Of course, he had probably already caught a few extra rems during the attack. Then he remembered the tingling sensation he had felt when the particle beam generator went off.

Vasquez grabbed the dosimeter clipped to the front of his shirt and brought it up in his shaking hand. He remembered getting the dosimeter on the first day he'd gone to work for his father's salvage operation in Martian orbit. They'd given him a lecture about the different kinds of ionizing radiation, and the acute and chronic effects of exposure. He'd only half listened at the time, but since then he'd picked up what he needed to know.

He suddenly remembered the day when he had threatened to quit his father's business, join the military, work on the amazing space ships he'd only read about. He remembered his father laughing at him, pointing to the badge.

"You think the military's going to take you with an exposure like that? You're dreaming, kid. They don't want to get stuck with the medical bills, getting you a new set of stem cells."

He'd been right, of course. Ben Vasquez wasn't always right, but he was not wrong so often that you'd notice it. They'd said he was crazy to buy the salvage rights to Venus, long before there was any salvage orbiting Venus. That the claim had become worth something only after Ben Vasquez was dead was only affirmation of his foresight. He had made a gamble that had paid off for his son, and he'd managed to control Emilio's destiny through his inheritance.

Emilio Vasquez slowly unclenched his fist and looked at the readout on the dosimeter. This morning it had read 213,452 mrem. This afternoon, the badge read 999,999 mrem. It was off scale. He'd received at least 787 rem in a single burst.

Probably a lethal dose. Without medical treatment, he might live twenty-four hours, not much longer. With that hit of radiation, every cell in his body would commit suicide, one by one, in an effort to save the whole body from the possibility of a cancerous mutation. The good news was there was a cure for acute radiation exposure. The bad news was that the jar's first aid kit contained only adhesive tape and a mild analgesic.

Vasquez felt the panic rise in him. A lethal dose. His mind simply could not wrap itself around this piece of information. He looked at his watch to guess how long he had. Then he remembered that it was time to enter the debris cloud of the *Ticonderoga*. The thought of tons of twisted metal hurtling toward him had the strange effect of clearing his mind, calming him down. This was a problem he could deal with. And then he had the battery power to worry about. The two problems together took his mind off the numbers on his badge. Time enough to worry about that later.

Floating through the debris field was like entering a three-dimensional graveyard. The security forces that had manned the *Ticonderoga* were everywhere, in various states of dismemberment. He didn't have any friends on the *Ticonderoga,* and a few of these corpses belonged to people he would have called enemies. They were officious pricks who'd obstructed him in the course of running his honest business. But he'd never have wished this end on them.

Around them was some great junk. The next salvage operation around this planet was going to find a gold mine in this orbit. A junk man's wet

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dream. Vasquez had his eye out for something in particular, though. He was in the waldo rig, scanning the cloud through the scope with the arms ready to reach out and push aside anything dangerous, or grab anything useful. The jar needed lithium batteries to extend the lifetime of the air scrubbers. The *Ticonderoga* would have been carrying lots of them. They'd be found on any equipment that needed an uninterruptible power supply. Vital computers, failsafes for the reactor, things like that.

A winking green light caught his eye. Something in this cloud had power. He gave the foot pedal a nudge, releasing just a little bit of compressed gas to push him closer, making a snap decision with no time to guess what it was. The jar drifted over to the winking light. With a hair trigger reflex born of desperation, Vasquez made the grab. The feedback mechanism told him he had something. He looked through the scope at the thing in his surrogate hands.

It was a pretty complex chunk of electronics. He rolled it over and found a charge meter. The lithium batteries were still pretty full. Whatever was attached to the battery, it wasn't using much juice. By the minor miracle of empty space and chance, he'd hit the one thing he wanted and missed everything else.

On the far side of the cloud, safe for now, Vasquez looked over his prize more carefully. He thought he might be able to pull the batteries out and simply swap them for his own as they ran out. But another possibility presented itself. There was a connector on one side of the piece of debris he held that had a distinctive shape. He knew the jar had the opposite connector on the end he thought of as the bottom. It might work to just plug these two connectors together, and then he wouldn't have to worry about losing power while he fumbled around with batteries. But then again, he had no idea what that connector was really for.

He decided to try it. If it started doing something funky, he'd be ready to pull out the plug right away. The arms just reached the bottom of the jar. He'd been right about the plug, it fit perfectly. Next, he checked the power levels on the life support module. No change. The connector might fit perfectly, but it didn't feed any battery power to the jar. He got ready to pull it back out again, when he noticed the green screen. Lines of code were marching down the screen, some kind of boot-up sequence.

"Now what the fuck is this?" He reached for the screen to adjust the enigmatic controls lined up beneath it.

"Sir," a voice snapped from the speakers. "Strategic advisory system theta five prime, reporting for duty, sir."

"Excuse me?" Vasquez said. The voice had come out of a speaker just above the green screen.

"Sir," the voice said again. "Strategic advisory system theta . . ."

"Yeah, yeah, I got that." Vasquez tried to read the lines of code on the screen and understood nothing. "Where are you? I mean, who is this?"

"Sir, at this time I appear to be attached to a standard data-com port on a type seven single occupancy module in Venus orbit. And begging your pardon, sir, but I am not a who, but more precisely a what."

"You're a computer."

"That is correct, sir."

"Will you stop saying 'sir'? You're making me nervous."

"I am unable to comply with that order, sir."

"Whatever, dude. I don't have the battery power for a strategic advisory

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computer right now, so I'm sorry but you're going to have to go back into the junk pile, my man."

"Sir, this unit has a self-contained power supply. I am available for consultation during military operations."

Vasquez had to laugh. "Military operations? Do you have any idea what just happened?"

"Please specify what time frame, sir."

"Five, five and a half hours ago. Do you know what happened then?"

"Five hours, twenty-two minutes ago, I went on standby mode, sir."

"And before that?"

"My memory does not include times previous to that, sir."

"Well, let me catch you up, then. You were a part of a spaceship called the *Ticonderoga,* which was patrolling the planet Venus. Then you got attacked and the *Ticonderoga* got blown to bits. You weren't much help during that military operation, were you?"

"It is likely that the crew of the *Ticonderoga* would consult me during a battle, but I have no specific knowledge of these events. Sir, if I may ask, are you a survivor of the *Ticonderoga* crew?"

"No, I'm from the *Chomper*. It got blown up, too."

"Then, may I ask for my own internal protocols, what is your name, rank, and serial number, sir?"

Vasquez laughed. "My name is Emilio Vasquez, my rank is supreme commander of the space forces of the planet Venus, and my number is 999,999."

"I'm sorry, sir, but my protocols do not accept that rank or that serial number."

"Oh, shut up," Vasquez said. The speaker fell silent, but the lines of code kept marching off the top of the screen.

Well, that was a waste of time. Vasquez started to work his way back into the rig to pull the device out of its socket and begin to dismantle it, but he stopped.

"Hey, strategic dude, you still there?"

"Yes, sir," the computer snapped.

"Do you by any chance know anything about radiation poisoning?"

"I have limited database resources that include the biological effects of various weapons systems on human crew members."

"Well, I just took a hit of about 800 rems. Looks like gamma radiation. Can you tell me anything about that?"

"That is a lethal dose, sir."

"Yeah, genius, I know that. What I'm wondering is, what's the medical treatment for a dose like that?"

"I do not have access to medical treatment protocols, sir. I suggest you refer this question to a medical doctor, or a medical advisory system, version seven or later."

"All right, all right, that's enough. I'm unplugging you, now. I need the batteries more than I need your advice."

"Sir, my database pertaining to the current strategic situation is incomplete. My advice would be much more useful if I were given up to date information. May I suggest you connect this module with your flight data computer."

"I don't have a flight data computer, man. This is just a jar with arms."

"Sir, the type seven single occupancy module is equipped with a flight data computer. It is a rectangular unit located approximately in the middle

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of the inside surface of the cylinder. The visible components consist of an oval screen with a green tint, a series of buttons . . ."

"Yeah, I know what that is. Now, what did you want me to do? Hook you up with it?"

"Yes sir. If you would press the button labeled OPCOM, my database will be updated automatically."

"What the hell? Here you go, man."

It didn't take long for the computers to do their thing. Within seconds the advisor was back. "Sir, medical treatment may be available on the enemy spaceship."

"Yeah, how am I supposed to get that treatment, smart guy?"

"Sir, the enemy spaceship that attacked this planet is of a type unknown to me. Please update the specifications file to the latest release and resubmit your query."

"I don't have any latest release, you moron."

"Update the specifications file to the latest release and resubmit your query."

"I'll resubmit you to the cloud of junk where I found you, you piece of crap." Vasquez stabbed at the buttons underneath the screen, all labeled with incomprehensible military acronyms. Not even the lines of code showed up on the screen. He stared at the buttons, trying to make sense of them. The only one he recognized was RESET. A button of last resort. He tried a few of the others without result, then reset the computer.

"Sir, strategic advisory system theta five prime, reporting for duty, sir."

"Let's try this again, theta five prime. What's the last thing you remember?"

"Sir, I've been on standby mode for twelve seconds, sir. I have no data pertaining to events prior to that time, sir."

"You piece of crap," Vasquez shouted, slamming the palm of his hand against the side of the flight computer.

The computer said nothing. Vasquez looked out of his windows, first one, then the second, and finally the last, before he found the enemy ship. It was just slipping away behind the planet. He wouldn't see it again for another five or six hours, as long as it didn't move.

"Strategic advisor? Talk to me, daddy."

"Sir, strategic advisory system theta five prime, reporting for duty, sir."

"That's great, buddy. Let's say I've got an enemy spaceship hovering over the north pole of the planet Venus, and I'm sitting in a jar, sorry, a type seven single occupancy module, that's about to run out of battery power, and I've got a lethal dose of rems besides. Now, how might I go about getting my sorry ass out of this situation? I'd really like to hear your advice on this matter, theta five prime. I mean, your advice served the *Tike* so well, I may as well take advantage of it, don't you think?"

"Sir, may I assume that the passive radar information stored in your flight data computer correctly describes the situation?"

"Oh, you can see the flight computer now? Excellent. It knows more about the situation than I do."

"Sir, your module has engine power sufficient to drop it into an orbit that will intersect the last known location of the enemy vehicle in four hours. Approaching the enemy in stealth mode will allow you to attach the module to the outside of the hull, where you will be able to cut your way inside. After neutralizing the crew, you will then be able to make use of the automated medical facilities on board to treat your radiation poisoning."

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Vasquez laughed, long and hard. He laughed so hard tears beaded up in his eyes and blinded him until he wiped them away with his sleeve. The laughing fit became a coughing fit. When he was finished, a mist of blood and phlegm hung in the air. The air handlers chugged a little when they tried to clear out the atmosphere. The radiation was starting to have its effect.

"That's your advice?" Vasquez asked when he had recovered. "You are one insane little computer, you know that? That attack must have scrambled your brains. Neutralize . . . what a riot."

The computer said nothing.

"By the way, what is stealth mode?"

"Sir, the module you are in is equipped with radar jamming hardware, and is shielded against passive detection. Stealth mode allows you to approach and even contact enemy spaceships without being seen."

"No kidding? Why the hell would a repair module have that?"

"Sir, the type seven single occupancy module is not a repair module. It is a weapons system, specifically used for boarding and/or sabotaging enemy spaceships."

"Shit, that's the last time I try to buy tools from a gun dealer. Sabotage, huh?" Vasquez thought about the tool kit attached to the outside of the jar in the light of this new bit of information. The laser welding torch that was way too hot on its highest setting. The sonic drill that made such short work of ceramic plate. And those crazy engines. He never had figured out why any satellite repair module would need so much delta v. Now he knew. And what had the computer said about passive radar?

"So, let's assume for the moment that I'm not James fucking Bond over here. Do you have any idea how I might sabotage this enemy spaceship?"

"Sir, I'm unable to process your request due to incomplete information on the enemy spaceship. Please update the specifications file to the latest release and resubmit your query."

"Oh, not this shit again."

"Update the specifications file to the latest release and resubmit your query."

"Just shut up already." Vasquez hit the reset button again. He had work to do now. He had to calculate the angle and length of burn he'd need to get his jar down into the intersecting orbit, and for that he'd need a computer that worked. Then, he had to come up with a way to sneak on board that spaceship. For that, he needed a miracle.

Emilio Vasquez had studied military ship designs ever since he learned how to read. His father had been right that he didn't meet the physical requirements for the military, but he had the mental capacity. He knew about every kind of engine used in spaceship design, both the real ones and the experimentals. He knew a little something about the magneto-warp engine. Enough to recognize that the spaceship that grew steadily in his front window was carrying one. There was no other reason for the six hundred meter torus with graceful radiating fins arching outward in a wedge shape. The torus was a superconducting magnet filled with a ferropolymer fluid. The crew was housed in a disk suspended inside the torus. The engine worked by pinching magnetic force lines and pulling itself along like a spider on its web, thus creating movement without throwing away propellant.

No military power was using magneto-warp engines that Vasquez knew

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of. But the solar system was a big place, and there were all sorts of secrets out there. Whoever had built this ship obviously saw Venus as an easy target, a rich source of material defended by people too stupid to get jobs policing any other planet. The only thing standing in the way of victory was a junk collector in a second-hand jar with arms, which was low on battery power and, truth be told, getting a little stinky on the inside. A pretty safe bet, in other words.

He was less than a kilometer from the ship, which was still just hovering over the pole, waiting for the miners in Cupid to heat up and die, or blast off from the surface and die. The cloud cover had rolled back in, hiding them, but not protecting them.

He had dared not use his engines since he had rounded the arm of the planet, not even the compressed gas thrusters. The flight computer, collaborating with the strategic advisor, had been able to put him right on a collision course hours ago, so running into the enemy ship was a done deal. He would reach out and grab part of the ship as carefully as he could and hope no one heard the noise. And then he'd find an external maintenance panel to get at some vital components. That was where he stopped hoping. Past that was just too far. The computer had come up with a couple more suggestions for getting onto the ship that didn't involve kung-fu and advanced hand weapons, but Vasquez wasn't so sure. He'd never heard of a data thief, the device that would fool the enemy ship's computers, and he didn't dare ask any specifics for fear that the strategic advisor would crap out on him again.

The ship loomed in the scope quickly, a radiating fin seeming to slice toward him like a giant knife. He readied the waldo arms. The dead black surface swept underneath him, blocking out the yellow cloud cover of the planet. Vasquez made a grab for the trailing edge. The feedback told him he had something, then the arms were pulled up sharply. The failsafes locked out the waldo rig before the force could rip his arms out of their sockets, but his funny bones stung terribly just the same. The big arms had stretched about thirty meters to absorb the shock, and were now recoiling slowly. He hadn't known they could do that.

He was there. No matter what happened now, the murderers on this ship would get a hell of a shock at some point. Someone had managed to get an attack module attached to the outside of their state-of-the-art war machine.

With the arms reeled in, Vasquez began to slowly travel, hand over hand, down the fin toward the torus. When he got there he pulled the jar up over the torus and into the narrow space between it and the disk that housed the crew. There were not many handholds on the edge of the disk, but he found a service hatch outlined in yellow. Nearby was a flattened oval attached to the side of the hull. He couldn't tell how it was attached, so he reached across the gap between the torus and the disk, grabbed the edge of the oval thing and slowly put the weight of the jar on it. It held, so he pulled the jar across the gap between the torus and the hull.

"You're going to have to walk me through this data thief setup, buddy. I didn't even know what it was. I've just been using it as a claw for holding spare parts while I worked with the hands."

"That is a creative use for the apparatus, sir. However, you will find that the thief can extract information from any standard or non-standard data port configuration."

"We just need to find a data port. Let's try under this cover, shall we?"

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Vasquez held on to the flattened oval thing with one large hand, then used a medium hand to try and open the hatch. It was locked closed, of course. The laser didn't exactly make short work of the job. It took a couple of minutes to cut away the latch. Vasquez was sweating by the time he was finished.

"God damn, I can hardly catch my breath," he mumbled. He glanced at the environmental status display on the wall of the cylinder. CO_2 levels were high, temp was high. The lights started to flicker. The battery was failing. "Shit, how could I lose power this fast?"

"Sir, your use of the laser hastened the decline in battery power."

"Oh, shit, I hadn't thought of that. I've got to switch those batteries, quick."

"Sir, if I may offer one more piece of advice, you will probably find a power jack under the hatch you just opened. It would be far faster to access that power source than it would be to dismantle my processor and change out your batteries."

Vasquez shook his head. "You're right. Why didn't I think of that?" He pointed his finger at the green screen. "Don't answer that."

Vasquez reached out and opened the hatch. Inside were several types of data and power jacks. He identified the one that was compatible with the jar's power system and plugged the power boom into the appropriate outlet.

The lights brightened immediately, and the air handlers kicked back in. Vasquez hung his head and rested as the cool dry air washed over him and dried the sweat on his skin. It took a while for the scrubbers to get the CO_2 back down. When they did, he was finally able to catch his breath. It had been seven hours since he'd last eaten, and he could feel the radiation sickness coming on slowly. He felt close, very close, to the limit of human endurance.

"Now," he said. "Let's see what this data thief can do."

The thief had a series of metal pins that adjusted to fit into any configuration of data port. He positioned it over each of the open data and communication ports and let the computer configure the pins and insert them.

"Okay, now what?"

"The thief will send probes through these data terminals and attempt to gain control of any command functions. It should take approximately five minutes for the results to come in."

Movement caught Vasquez's eye. He turned to look out the window in time to see a figure in a spacesuit swing up over the torus on a cable and disappear on the other side. The figure moved with the ease of someone born to space combat. It was moving toward the jar.

Vasquez pulled himself into the waldo rig as fast as he could. He didn't bother with the right arm. That one was holding the jar in place. Vasquez shifted up to the big meat hook just as the person in the spacesuit swung back under the torus toward the module and brought up a weapon of some kind. Vasquez caught the attacker in his meter-wide claw hand and squeezed. He felt the initial resistance, then the snapping of bones. Vasquez felt a little bit sick.

The jar rang with the impact of a weapon, and a dent appeared under his feet. He turned the scope in that direction and found someone with a rocket rig flying under the jar, pointing a weapon. He drew back his arm and threw the body he held in his fist. His aim was good. The cable snapped and the body crashed into the guy in the rocket rig and knocked him off course toward the yellow cloud deck of Venus.

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"Jesus, what the hell was that just now?"

"Sir, structural integrity is slightly compromised as a result of the attack. No damage to critical systems. It is likely that other attacks will follow. Might I suggest that in the future, you make use of the targeting sight and the laser to fight off these attacks, rather than the actuator arm."

"Oh, thank you very much, mister come in with the advice after everyone is dead. Is this how you helped out the *Ticonderoga*?"

"I have no memory of events that occurred on the *Ticonderoga,* sir."

"I can't believe I just killed two people." How was he supposed to fight his way on board this ship if he couldn't stomach the idea of killing people? This was war, right?

"Sir, the data thief has returned with the results of its probe. It has gained control over some of the ship's systems, but not all of them."

"Okay, well, that's good then. Can I keep these people from coming out and attacking me?"

"No, sir."

"Well, can I get the airlocks open and get onboard?"

"No, sir. Airlocks are not available."

"Life support?"

"No, sir."

"Communication?"

"No, sir."

"Uh, okay, here's a thought. Why don't you tell me what we do have control over. That might be faster."

"I'm listing them on the screen now, sir."

The list was pretty short. It didn't even take up the whole screen. "Well, it looks like I'll be able to disrupt the food service in the ship's cafeteria. That'll teach these bastards not to attack *my* planet."

"That is unlikely, sir."

"Hey, and I've got plumbing, too, so I can back up the toilets."

"That is of dubious strategic value, sir."

"Hold the phone, daddy." Vasquez pointed his finger at the screen.

"We do not have access to communications, sir."

"Plumbing. That includes heat exchange, doesn't it?"

"Yes, sir."

"Maybe I could make them cook in there like they're doing to Cupid. Of course, it would take hours to get the heat up to dangerous levels. Now, their engines, on the other hand—they must be using a lot of power to keep hovering here. These magneto-warp engines are supposed to put out a lot of heat. Just look at the size of those radiating fins. If the heat exchange is stopped, the ferropolymer overheats and breaks down, then the engine can't generate a magnetic field anymore and the ship will shut down."

"I am unable to assess the effects of a disruption in heat exchange on this ship design. Please update the specifications file to the latest release and resubmit your query."

"No, please don't do this, not now."

"Update the specifications file to the latest release and resubmit your query."

Vasquez punched the green screen with his fist. "You son of a bitch," he screamed. Blood from his torn knuckles smeared across the letters on the screen. "Not now, you son of a bitch." He hit the reset button. Nothing happened. He looked down at the dent in the bottom of the jar. The processor

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was plugged in down there. It could have been damaged in the attack. The green screen wasn't changing.

Well, there was one change. The food service option was highlighted, glowing bright green under the blood from his hand. He reached up and touched the screen again, under the plumbing option, and it was highlighted. The screen was touch-sensitive.

At the bottom of the screen was the word ACCESS. He touched that and was given a new list of options. He selected HEAT EXCHANGE, then the word DISABLE appeared. He got ready to touch that word.

And he paused. He knew what would happen if he managed to shut off the heat exchanger. He had come this far to save himself, but what he was about to do was suicide. His finger hovered over the word DISABLE. He realized that he wasn't going to save himself. That had never been possible. Then he thought of the miners in Cupid and the other smaller bases on Venus. He couldn't save himself, but he could save them.

Vasquez took a deep breath and touched the screen.

Something stopped. Working in space, you never noticed the various hums and rattles of the machines that constantly surrounded you until they stopped. Some noise on the enemy ship that had been transferred through the hull, through the waldo arm, and into the jar, wasn't anymore. Then he heard the faint and faraway sound of an alarm.

"Critical Heat Exchange Failure" was displayed on a screen inside the service panel. Vasquez waited, fingers crossed, listening for the sound of the exchangers coming back on. They must have a backup system, right? But the warning message kept blinking. Then he waited some more. Surely they would come out here and kick his ass now, right? He had monkeyed with their ship, they must be pissed as hell. But no one came. So he waited some more, until the faint sound of the alarm changed its tone.

"Emergency Engine Shutdown" was the new message on the screen. The massive spaceship no longer hung perfectly balanced over the north pole of Venus. Now it was spinning, and falling.

"I'll be damned," Vasquez mumbled to himself. He knew the limitations of the technology, the dangers of this engine design. But what he knew was theoretical, the design of the magneto-warp engine as it was years ago, before it had even been built. And yet, here was the proof that the limitations were still there. Engineering had not found a way around the problem after all.

There was a jolt, then a second. Vasquez watched out of a window as two escape vehicles blasted away from either side of the disk and headed toward the horizon. It appeared that the crew had taken the opportunity to exit, stage left. Not a bad idea. He switched on the radio and dialed in the frequency from memory.

"Cupid base, this is Emilio Vasquez. Come in Cupid."

"Who?" came the answer.

"Emilio Vasquez. Listen, I just wanted to tell you guys that the spaceship that was bombing you is going to crash into your planet, so you can go ahead and jump in your escape pods. Tell the other mining bases, too, just in case they can't hear me."

"Emilio Vasquez, the junk man?"

"Yeah, let's see if we can all get on the same page, guys. Vasquez the junk man is telling you it's time to get the hell out of there. You might want to wait until the ship crashes so you don't hit it on the way up."

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"Why is the enemy ship crashing?"

"It's a long story, Cupid. They had some plumbing problems." He coughed up a little blood, wiped it off his chin. He didn't want to sound like a hero. Even though he felt a little bit like one. "You guys think you'll be okay waiting for a rescue?"

"Sure," the voice from Cupid said. "Resupply is coming in a week. Our escape pods are good for at least that long. What about you?"

"I believe I'm crashing along with the enemy ship. Good luck, Cupid." He switched off the radio. He didn't feel like finishing that conversation.

The spaceship was shaking and spinning fast, now, and headed toward Venus. Vasquez wondered what he should do next, ride it down to the planet surface, or jump off and hope for a trajectory that would take him out away from the planet? He chose poor odds over no chance at all. He pulled himself into the rig in order to release his grip on the flat oval thing, but the shaking of the spaceship beat him to it. The jar broke off and was flung out by the spin. The lights dimmed right away, and the soft hum of the air scrubber quit. He watched the ship slip into the yellow sulfur clouds of Venus, as he sailed off in the opposite direction.

He looked into the scope and saw that the flat oval thing was still gripped in the claw of the waldo arm. It was difficult to shift it without the servo motors, but he managed to do it. It was something to do while he waited to suffocate. He turned the thing over. On the other side, next to a standard air lock adapter, was a sign that said

Single Occupancy Module
Type 9: MEDEVAC UNIT
With Robodoc v. 8.1

Vasquez grinned and started to line up the air lock adapter with the one on the jar. Nice piece of salvage. O

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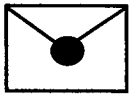

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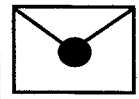

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THE GREAT ECONOMY OF THE SAURIAN MODE

Michaelene Pendleton

Illustration by Darryl Elliott

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The author's fiction sales include stories to *Omni*, *Asimov's*, *F&SF*, *Century*, and *Dragon Magazine*. Ms. Pendleton lives in Moab, Utah, where she works as literary assistant to Terry Tempest Williams, manages the Moab office of Inskip Ink Publishing Company, and owns Lavender Lizard Beads.

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I knew he was government the minute I saw him. Conservative gray leathers, short dark hair slicked back, mirrored UVs pushed up on his head, I figured him for IRS so it was a real surprise to see the silver DOI buffalo heads flashing from his narrow collar. He came around the corner of the stables, walking like he didn't want anything sticking to his high-gloss jackboots, his eyes on my team like they were solid gold and about to melt any minute.

I had just watered down the sorsh. Steam rose from their green-mottled hides as they stretched out muscle kinks and chittered away in whatever passed for an adrenaline rush in their xenosaurian chemistry. All three of them were high with winning, slit-nostrils huffing, membranes snapping back and forth over their orange eyes, snouts half open so that you could get a glimpse of dozens of back-curving teeth in the sorsh version of a victory smile.

"Hi. My name's Nick OCallan. This your sorsh team?" The easy grin and the hand he stuck out were for me, but his intense blue gaze was on the sorsh.

The question struck me as rhetorical. I whistled through the gap in my front teeth to get the team's attention. "This is Kharkh, Sehn, and Yhss, Team Sorsh White Edge, who, I am proud to say, just won the first heat of the 32nd Iron Thing Triathalon." To the sorsh, I handsigned *Fat rabbit who controls land. Likes you. Maybe police.*

They are shameless in their desire for attention, rowdy roisterers always ready to strut for an audience. Kharkh stretched to his full two-meter height, preening the indigo crest running from the flat of his wedged head to the end of his sinuous tail. Long muscles slid iridescent waves over his pebbled skin. Sehn and Yhss flowed through their warrior's poses, scarlet tongues flickering hisses at OCallan, handsigning way too fast for me to keep up, but something about the taste of fame.

OCallan barely hesitated before he held out his hand to the sorsh in their fashion, palm up. Kharkh glanced at me for the okay before he delicately touched his claws to OCallan's fingertips. Yhss followed Kharkh's lead, but Sehn twitched one claw. A bright drop of blood appeared on OCallan's thumb. He ignored it. "A fine team. Congratulations."

Then he turned the full force of that big, white-toothed grin on me. "And you're Sonia Vasilyeva, Sorsh Runner Registry Number SV004."

Unlike my sorsh, I get twitchy when someone knows who I am. Fame gets you in trouble, more often than not. "So?"

The sorsh picked up my unease and became suddenly very still, their toothy snouts centered on OCallan.

OCallan showed no sign of noticing. He unzipped his left sleeve and bared his forearm, showing me his ID imprint with a holo of the Department of the Interior seal and Special Security designation. "The Department needs you for a hunt."

I'm good at controlling my emotions around the sorsh. If I wasn't, I couldn't run them. Damping the anger that surged in a sullen wave, I signed to the sorsh to head for the mud pool to stay limber for the next heat. Kharkh hung back for a moment, watching, before he followed the others.

The sun slanted in over the rim of Meteor Crater, reflecting on thousands of UV glasses in the stands built up the sides of the bowl. A raw-throated roar bounced around the arena, echoing from side to side, more animal than human. But then, forty years ago, humans would have thought that most

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of the xenos packed into the stands *were* animals. Less than human. That got knocked out of us pretty fast. Learning that the only reason the galactic Dyarchy contacted you was so they would have another frontier world on which to dump their riffraff cuts you down to size real quick.

But life goes on and you gotta eat. By some weird kink in galactic chemistry, I have the right combination of pheromones and emotional stability to run sorsh, to bind them to me so that my well-being is their first concern. It's a genetic imperative in their species to protect any female who smells like I do. We make a good team. I'm culture-normal, so I make the plans, do the paperwork, and the sorsh are lethal and loyal brawn with a nasty sense of humor.

In their own culture, my sorsh are the lusty males, the pirates and brigands, the swashbucklers who push the boundaries and step off the edges, lured by curiosity and dreams of glory. In Dyarchic space, they're criminals whose racial name translates as *kineaters*.

OCallan waited me out while I pretended to watch the sorsh leave and reminded myself that in the halls of power, I wasn't even a janitor. And this easy-standing, smiling man was more than he had yet showed. I dried my hands on the towel hung around my neck and pushed sweaty hair off my forehead. "We're not in that business anymore. We retired."

He had the kind of grin that started with his eyes and warmed you all the way to the ground. "Washington told me that's what you'd say. Give me a chance to change your mind."

"We paid off our contract. We're free and clear."

He ducked his head. "Look, I'm not trying to bludgeon you into this. Just let me lay out the deal."

"Not interested."

"The money's good, and it's a perfect hunt for the sorsh—"

"Mr. OCallan—"

"Nick."

"Mr. OCallan, we've brought in murderers, rapists, terrorists, kidnappers, and two women wanted for high treason. It's an ugly life and we've done our share. Now we're finished. As far as the money goes, my team is about to win 400.000d in this competition. You can't give me anything we need."

He nodded. "Yeah, they'll probably win. I watched the first heat. No other team can match them for speed. They'll likely take the agility heat, but they're not likely to take the strength trial. The Ferroven Blue team has got two gravities on your sorsh, and armor that will turn their claws."

He had a good eye for the virtues of the teams. I was a little worried about the strength trial, too. "The points are cumulative. If we take the next heat, we can come in third in the last heat and still take the title."

"And run the risk of getting them seriously hurt. The fans want blood, and the Ferroven will be glad to give it to them. The Blues won last year because the other finalist teams didn't have enough members on the field to finish the trial."

He had that same ability as the sorsh to be very still, to focus totally on his intent. I felt like I was being skewered to a pin board.

"And if you win, what then?" he asked.

"We buy a piece of land with plenty of game for the sorsh, and peace and quiet for me."

He chuckled. "If your team is the new Iron Thing Champions, peace and

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quiet is the last thing you'll have. Every sporting goods manufacturer, every crook and shyster from every planet in this slice of the galaxy, will be after them for endorsements, personal appearances, live-action commercials, get-rich-quick schemes. Is that what you want?"

"We'll weather it. There'll be new champions next year."

OCallan shrugged. "Maybe. Look around you: livesat cams, color, noise, excitement, hard money, all the trappings of fame. I hear it gets seductive."

He was right, of course. The sorsh loved it. They'd want to do it again next year, and the year after that until they were killed or beaten.

He leaned in at me, still grinning. "Sonia, let me be honest with you. I'm authorized to go as high as 600.000d for a successful dead or alive hunt, 300.000d even if we fail. One human, armed and dangerous, a terrorist gunrunner, alone in the Dark Canyon Primitive Area. We need this done quietly, no upsetting the tourists. A week maximum, full government compensation for any and all injuries or deaths, first-class logistics. And then it's all over. You have the money and the freedom of anonymity. You can do what you want, go wherever you want." His voice dropped into an intimate murmur. "The sorsh will do what you tell them. Leave right now, before the next heat. Scratch the team. I have a jumprig waiting; you can be at the trailhead in three hours."

And damn him for a slit-tongued liar. It wasn't that easy. It was never that easy. I whistled the sorsh out of the pool, gathered them around OCallan, and handsigned, *This man wants you for hunt. Now. Big money, bad job.*

Our physiology prevents much verbal communication and they steadfastly refuse to learn to read and write in either language, such activity being beneath their warrior status. They respond to my attempted pronunciations of their names, but I had to learn their hunting handsigns. It limits our conversations mostly to pragmatics.

The sorsh hissed and snicked to each other for half a minute, then Kharkh signed, *Yes. After win.*

No. Now. Quit contest.

Kharkh's claws cut the air. *Win first.*

I shook my head. I could feel OCallan's impatience at my shoulder.

Sehn hissed for attention. *Win here, get big metal thing and money? Go on Chewed Bone Path, kill and get money? Not both?*

"Yes."

OCallan's grin got an edge to it. "What are they saying?"

"They're deciding where the most honor lies in this situation."

The five-minute warning klaxon for the second heat blared over our heads, answered by a surge in the crowd noise. Kharkh raised his long head, tongue tasting the air. *Female, what think? Yes, no?*

Tired of hunting and maybe killing people, was what I wanted to say. I signed, *You choose, warrior.*

Kharkh chittered, and Sehn and Yhss puffed up their throats, agreeing with him. *Make bargain, female. Run next heat, beat rot-slime Wasash team, take their honor, then go hunt. Make happen, yes?*

Sometimes their perfect trust in me is an ethical pain in the ass. *Try.* I hung my head, chewed at my lip, scuffed in the sawdust. "They're not interested," I said.

OCallan's voice got calm. I didn't need the sorsh's pit sensors to feel him smooth over. "But you can change their minds, Sonia. It's a good offer, good money."

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"They don't care. They want to win the Triathalon."

If you'd run my somatotype preferences through a computer, you'd have come up with OCallan. Maybe they did, because he was using all the wattage of that friendly, open grin and those galvanic blue eyes to reach me.

"I need you, Sonia. You and your team. I have a killer running loose somewhere in about a million square acres. I can't pick him up off satscan because there's also about a million Dyarchic tourists wandering around the same area. Every one of them is in danger. We need this done quietly. We need your sorsh team."

The two-minute warning sounded. The sorsh hissed with eagerness. I looked at OCallan. "We'll run this heat, win or lose. Then we'll do your hunt, but we want the extra 400.000d they would have won here, and Dyarchic Freespace Passports. The passports up front." I gave his smile back to him. "I can talk them into that."

OCallan joined me at the barricade, UVs down, hanging his arms over the railing and looking down into the trials pit. "DOI says to give you what you want, but I think you just derailed my promotion track for a couple of years." He held out four bright new passport chips and shined on that grin again. "In return, how about you pretend I'm a real human being and not a government cog?"

I tucked the passport chips in my neck purse. "I can do that."

The teams were milling around in the starting circles, bristling at each other, but keeping it clean under the eyes and sensors of the referees. They weren't free to injure each other until the contest began, but insults to your maternal being sound much the same in any language.

No humans at this level of competition, these days. We aren't fast enough, or big enough; no fangs or claws, no spikes or carapaces or venom. All we are is vicious enough, and that hasn't gotten a human past the prelims in a quarter of a century. Turns out we make a great training planet, though.

Last year's champions, the Ferroven Blues, are from a higrav planet some 50LY toward the galactic center. They look and sound like hairless bears that have grown their own football armor. Their hides are pumpkin color and their shoulders sparkle with implanted milky jewels. The shortest one was half a head taller than Kharkh and outweighed him by a factor of three.

The Wasash, in Red, are another reptilian race, which is probably why my sorsh are so scornful of them. When I ask them, they only sign something about the Wasash laying eggs in tall trees, a cultural insult that escapes my sensibility.

The Hurove Greens have no single Terran analog. Parts of them seem insectoid, parts cephalopodic, parts mammalian. They look *wrong*. Your eyes kind of slide away when you try to look at them. They're mostly dark blotches with various protrusions. Good all around competitors, though, even if you can't quite tell how they move.

OCallan's nostrils widened, taking in the mingled smells of the arena, a compound of mud, sweat, bloodfluids, and the lust of the tight-packed crowd.

There are two kinds of spectators at sporting events: the investors who risk nothing but money, and the lusters, who fantasize being out there, win

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or lose. I would have bet OCallan for the first, but I was wrong. He was reacting physically to the blood-energy.

The scoreboard strobes went on, flashing through the range of visible light for each team. The teams settled into their starting positions. I forgot OCallan.

We'd gone over strategy and tactics until Sehn finally had a fit and refused to study any more, his raised crest and slitted hiss saying he was serious. We could beat any team on agility, but we had to get past the Blues to reach the first obstacle, an inward-leaning bungee net salted with 125 decibel sonic grenades.

Our starting placement wasn't all that good: second, with the Blues third, right next to us. The Blues weren't big on subtlety. When the starter's strobe flashed, they made no pretense of following the course. All three of them lunged for my sorsh.

Sehn followed the plan, bless his heart. With an eye-tearing burst of speed, he went for the net, slashing a claw at a Wasash Red on the way. Kharkh and Yhss ganged the lead Blue, taking it down in a tumble of flashing scales, then split to engage the other two.

The Blues were slow, but damn they were big. One caught Yhss with a backhanded blow that knocked my sorsh thirty feet across the sand. Yhss lay unmoving while the Blue lumbered down on him. Kharkh had the other Blue tangled up in its own legs as he circled it, slashing with his feet claws, finding chinks in its armored hide, pale pink blood beginning to splatter the sand.

Sehn had streaked past the rolling skitter of the Green team and was halfway up the net, stretching for a grenade. He grabbed one, popped the pin, and tossed it at the two Reds who had clotted up on the net below him. The concussion flung them to the ground, taking a Green with them as they fell. Sehn slithered sideways across the net, going for another grenade.

Yhss was half up, shaking his snout, with the Blue looming over him with a raised fist the size of Kansas, when Kharkh slid past his opponent and loosed all that wiry muscle into a flying tackle that brought the Blue to its knees, Yhss rolling wildly to the side. Kharkh yanked Yhss to his feet and they lit out for the net, all three Blues on their tails and a Red and two Greens between them and Sehn.

They split at the net, Yhss leaping over the two concussed Reds, scrambling toward an unguarded patch of grenades, Kharkh swarming overtop the various protrusions of a Green, slashing back with his hind claws, slowing the jumbled mass, but not stopping it. A reptilian Red fastened his jaws on Sehn's whipping tail, dragging my sorsh back into the clutches of the other Green, becoming a hissing, growling, whistling, tangled ball of legs, tails, pincers, and tendrils. Kharkh darted to the left around them, climbing the bouncing net with a burst of speed not yet seen. From a position above them, Kharkh gripped the net and shook it, dislodging one Blue that fell ten meters, landed with a sickening crack and didn't get up.

Saurians are masters of energy conservation. Alone among a patch of grenades, Yhss was still, sides heaving, ignoring the two concussed Reds who were now crawling slowly up the net at him, his eyes on Kharkh.

Kharkh hung from the net by his back talons, slashing at the tangle around Sehn with his foreclaws. He must have ripped something important on one of the Greens, because all its appendages folded inward and it dropped from the net to lie curled up on the blood-splotched sand. Kharkh

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grabbed Sehn's hand and pulled. Sehn came halfway out of the tangle, then lost his grip, dragged back into the melee that now included a Ferroven Blue. The other Blue was coming in sideways at Kharkh, its massive paws stretched to gather up my slender sorsh into its bone-crushing grip.

Kharkh fled. He swarmed up the inward incline of mesh, scrambling as far as possible from the tangled clot of fighters.

I heard OCallan grunt, a scornful negation of Kharkh's flight.

From the top of the net, Kharkh wound his arms and legs through the strands, then shrieked a saurian warcry, a knife edge sound that stood your neck hair on end.

Yhss returned that cry, and tossed a sonic grenade at the struggling mass around Sehn. The detonation cleared the tangle from the net, all except for Sehn who had, after all, studied the plan, and was left hanging unconscious but with all four limbs thoroughly tangled in the mesh. Kharkh went for Sehn while Yhss lashed his tail at the two Reds below him, snicked one quick claw along a Red snout, and leaped for the top of the net.

With Sehn's limp body over one shoulder, Kharkh joined Yhss. Leaving a hissed insult in their wake, they flickered across a half-meter Teflon-covered pipe bridging a pit of stakes, down a slope of buckyballs spiked with razor-edged baffles, and strutted across the finish line in a contemptuous walk, Sehn's arms stretched across their shoulders, his pupils only wandering pinpoints in his orange eyes, but his feet on the ground.

The crowd, as they say, went wild.

The sorsh weren't happy about scratching a sure win. They wanted their pictures taken with the trophy, preferably with their feet propped up on the submissive bodies of the Wasash Reds. But they understood 600.000d over 400.000d, and agreed that their honor was satisfied just in defeating the rot-slime Wasash. I didn't yet tell them about the passports. To be able to see space again, other planets, to rieve and roister—they didn't need that distraction right now.

OCallan was looking at them with different eyes. He'd never seen how that saurian ability to conserve energy could be released so explosively. He kept shaking his head and grinning, saying he'd never seen them *move.*

He still hadn't. I didn't see any reason to enlighten him.

It wasn't a pleasant ride from Meteor Crater to the Dark Canyon area in the southeast corner of what used to be part of Utah. Even nose-dead humans could smell the fluid that oozed from the sorsh's femoral pores, in their world, a call to all available females that here were victorious warriors, deserving mates who would produce strong offspring. To us, it smells like rancid bacon.

Below us, the land swept upward in broad strokes, red-brown and yellow and gray, dotted with oases of green where enough water collected to support a few cottonwoods and tamarisk in this arid desert. Towns were few and far between. Sheep dotted the roadless expanse of the NavaHopiUte Republic, punctuated here and there by villages of three or four hogans. The land started breaking up the farther north we flew, pierced by dark spires of ancient volcanic vents, sandstone buttes and mesas; and cutting through the land like a Mandelbrot fractal, the Colorado River and its tributaries carving tortured canyons from the rock. Hot, dry, much like their homeworld, it is just the kind of terrain the sorsh love.

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When we passed over the Greater Mexican Hat Metro area, Yhss was avid to open a porthole so he could spit down on the city, but the pilot said no. Just as well. If Yhss had done it, Kharkh and Sehn would have wanted to do the same. Then they'd have wanted another pass to see who could do it better. A sorsh spitting contest can go on for hours.

We set down at the Kigalia Guard Station on Elk Ridge. A cool wind was wandering through the Ponderosa pine, taking the edge off the sun's rays. The sorsh flattened their crests and spread out to bask while OCallan and I unloaded our gear. The NPS ranger, an old woman weathered as badly as the once white clapboard siding on the tiny hut, viewed us with narrowed eyes, obviously no love lost for a DOI Special Security agent—or an alien hunting team, either. I figured her for one of the old farts who are forever nattering about how good the world was before the Dyarchy. As if it mattered in today's reality.

Our vehicle was an ancient SUV, a hunk of topless rusted metal missing its fenders. When the guard reluctantly stabbed her thumb at a track of broken pavement leading west through the forest, saying, "Your man headed out that way," Yhss signed to me, *Now? We go, yes? Kill, yes?*

Hunt, yes. But take alive, no killing. OCallan didn't seem to care how he brought his man back, but I like to discourage the sorsh from killing sentient beings if I can help it. I'd read the file on the prey: one Sebastian Johns, a Navajo accused of gunrunning for the Republic, a terrorist or a patriot, take your pick. The dossier was empty of any information of substance, just the usual government disinformation spin stuff that could be handed out to any media flacker. What the hell, his guilt or innocence wasn't our problem. I learned long ago that moral judgments usually get you into trouble. For the sorsh it was simple: pay us and we hunt.

OCallan took us inside the guard hut, pointing out where Johns had rifled the dry food stocks. The sorsh took his scent, Kharkh's flicking tongue carrying the information to his nasovomeral glands. *Ah, good.*

Easy, Sehn agreed.

"What did they say?" OCallan asked.

"The trail is strong. They'll have no trouble following it."

He pushed his UVs up on his head. "Can you teach me to talk to them? It could be useful if we run into any trouble."

I shrugged. "I can teach you the hunting signs, but the sorsh won't pay any attention to you."

"What if something happens to you? How do I control them?"

"You can't. You don't smell right. It doesn't matter to them that I'm a Homo sapiens female—their own species is oviparous. Form doesn't matter, pheromones matter. If they're not chemically shackled to me, they'll make their own decisions on how to deal with you."

He nodded his head slowly. "I'd better make friends with them, then."

"You can try." He still didn't understand.

With the sorsh darting ahead of us, OCallan and I piled into the SUV and headed into the forest. With OCallan driving, I took a look back at the old ranger watching us leave. Just as we disappeared around the first turning in the road, she gave us the finger.

Dry pine crackled in the firepit, unnecessary with our finest government self-heating food packs, but comforting amid all the darkness. Living in

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cities makes you forget how much of the planet is still wild; even more, maybe, than there used to be before all the offplanet migrations. They say our air is cleaner with the advent of Dyarchic technology. I don't know, but what we were breathing that night was cold, fresh with the sense of never having been breathed before. It smelled of lonesome distances and the possibility of strange adventures.

We'd found Johns's battered old pickup truck abandoned above Black Steer Canyon. Kharkh showed where Johns's scent led over the canyon rim along what looked to be an old cattle trail, less than six feet wide in some places, clinging to the cliff-face—not a path to take in the dark.

OCallan didn't look like a man who would be comfortable sitting with his butt on hard ground, but he had a grin big enough to light up a small city as he crouched before the fire, feeding it with pinecones to watch them flare. He nodded at the sorsh, an entwined pile that seemed to have too many limbs, at the edge of the firelight. "I thought lizards were solitary critters."

I stretched and settled my hip into a sand hollow. "Terran lizards are. You can't think of the sorsh as earthly animals." The pile twisted and Kharkh's head appeared. He hissed a sigh of contentment at me and stretched his jaws, tongue lolling.

OCallan fed one final cone to the flames, then settled back on his blanket. He looked up at the black sky. Spica in Virgo was bright overhead. "I wonder how it felt to look at the stars and imagine space was empty."

"My mother said we felt bigger then."

He flopped down on his back, knees bent, head pillowed on his arms. "Your mother was from Havana."

"And my father was from Kiev. So?"

"So I've never seen a brown-skinned, red-headed woman before. You wear your hair long."

"It helps distribute my pheromones into the air."

"I've read your file. No living relatives, no long-term commitments. You don't have a life apart from the sorsh."

"What kind of a life do you think I need?"

"A social life. Friends."

"Kharkh, Yhss, and Sehn are my friends."

"But they're not human."

Always it came down to that. Every damn conversation about the sorsh. "So?"

"So what do you do for—" He waved his hand in a vague gesture. "Someone to talk to, get drunk with, dance, whatever."

"Why do you think I want those things?"

"Most people do."

"Most people aren't capable of running sorsh."

OCallan turned on his side, his head propped on one hand. Firelight flickered in his eyes. "You're ducking the question, Sonia. You're human. The sorsh are not. They can't give you what another human can."

What? A hard time? I could have spent the rest of the night relating how I've been screwed over by humans. I sat up and poked another stick into the fire. All three sorsh heads slid free of the pile, slit-eyed with pleasure at the love I sent wafting their way.

"You've never run sorsh. You can't imagine what it's like to live among three sentient beings whose only purpose in life is to keep you happy. No, they can't discuss our classic literature, but their favorite firetalk concerns

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the same questions that puzzled our philosophers. We just talk in more basic terms. If you think about it, you can discuss most human concepts in a warrior/hunter vocabulary."

He laughed. "Okay, okay, I give. But if you can't actually talk, how did you learn their signs?"

"There's a sign dictionary in my pack. Once in a while I still have to use it, but their basic language is so compressed that one sign means many things depending on body attitude, eyes, crests, throats, claw extension, color changes—you just have to learn by experience."

"How did you get them to obey you before you got fluent?"

That's the point no one ever understands. "The sorsh don't 'obey' me. They follow my directions because they trust me and want to please me. If they seriously object to something, I step back and take another look."

"And if you decide to do it anyway?"

"They do as I ask."

"There's a difference?"

"Yes. Because they know that I won't ask them to do something that dishonors them."

I could see a thousand more questions behind his eyes, but he held them in. I had some questions myself, such as why DOI was willing to pay six times our usual fee for a hunt *and* give us Dyarchic passports. Either this Johns guy was a *hell* of a gunrunner, or OCallan hadn't told me the entire truth about this hunt. I was betting on the latter.

I always get a good night's sleep with the sorsh on guard. OCallan looked like he hadn't. I was building the fire by the time he managed to crawl out of his sleeping bag. "Coffee's almost ready," I said.

He grunted and ambled off into the trees.

Kharkh settled beside me, deigning to hand me a stick of pine. *He does not fear prey.* He tilted his head back and looked at me down the length of his snout. *Why?*

True. OCallan was wound loose. No tension in his body, no over-the-shoulder looks at unknown noises, the guns strapped down. Could be that he didn't have enough field experience to know whether or not a situation was dangerous. Could be that he depended on the sorsh to warn us of danger. Could be a lot of other things, too. *Good question,* I signed back.

Even Dyarchic technology can't make powdered eggs taste much better than a cardboard box, but it doesn't much matter since my coffee takes all the morning hairs off your tongue. By the time the sun rose over the peaks of the Abajos, we were packed up and ready to go. OCallan's official government-issue backpack had a bit of maglev, so he carried more than his fair share, which was okay because I'd have thrown away about half the crap he brought. The stuff solidified my suspicion that he was a HQ agent, not a field man.

He had some damn interesting armament on him, though. A pulse-projectile rifle slung over his shoulder was latest issue. His hand-held recoilless 12-gauge made my Sig auto look like a popgun.

I don't carry much weaponry. I have the sorsh.

The old cattle trail baled over the edge of the canyon, sand and rocks, with a long drop to the bottom. I stood surveying it while the sorsh faced the east and chanted their rising sun song. OCallan watched the sorsh. "What are they saying?"

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"I don't know. I'm not warrior caste so they don't talk about warriors' religion to me."

"What caste are you?"

"I have no caste. I'm the most perfect being on the face of the earth."

"But you haven't let it go to your head." He said it so seriously, it took me a second to catch the lurking grin. Damn, he even had a sense of humor. It was getting easier to like him, DOI Special Security or not.

We reached the canyon floor about two o'clock. OCallan wasn't used to hiking in broken terrain. He moved like a man whose depth perception was formed by concrete and carpets. It took him half the morning to loosen up, to fall into that spring-kneed walk that carries you over rocks and through blow sand, across gullies and around prickly pear spines, covering ground with the minimum of effort. At least he wasn't a complainer, though I did hear a bit of muttered cussing from time to time.

The sorsh were waiting for us, all three of them flattened within the scarce shade of a sandstone boulder. We'd descended from the cool of the pine forest into a barren, rocky gouge in the earth so sun-wasted that there was no green even along the stagnant pools of the stream that sometimes trickled down Dark Canyon on its way to the Colorado. Yucca, edges frayed by the wind, fought with sagebrush for a hold on the alkali soil. Dirty-yellow cliffs lifted above us, their flanks littered with blasted and fallen piles of broken rocks.

Sehn uncoiled from the shade and came to me, his taloned fist gently closed. His other hand signed, *Look.* He opened his fist. In his palm lay a tan side-blotch lizard, its sides heaving and its throat fluttering. It pumped its front legs, bouncing up and down as it threatened us, its ribs spread wide. *Someday, sorsh.*

Mean enough, I agreed. Sehn knelt and lowered his hand to the sand. The lizard leapt from his palm and skittered for cover.

In the sun, the sorsh's darker mottling turns a lime green. Every time I see it, I am struck anew by how beautiful they are. Sehn caught the emotion and preened, then grinned.

OCallan took two drinks from his refrigerated canteen, spitting the second mouthful onto a red bandanna that he tied around his forehead. He looked doubtfully at a drying puddle of filmy water. "Think my purifier can handle that?"

"If we push on, we can make it to Young's Canyon tonight. There's better water there."

"We're not going to catch up with Johns today?"

I asked Sehn, who signed back, *We go too slow. Prey is faster. More than a day.*

"Tomorrow, maybe, if we can make up some time. Sehn says we're too slow."

It wasn't an accusation, but he heard the truth behind it. "Then we'd better move out. I'll keep up."

He did, too. It was rough traveling and his butt was dragging when we sighted the turquoise-green spring-fed pool that marked the juncture of Young's Canyon with the main cleft of Dark Canyon. In truth, I was ready to pack it in myself. It had been a while since we'd done a hunt that covered this much ground.

We made camp fifty yards down canyon from the pool, high enough up

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the southern wall to be above the flash flood line. While OCallan gathered deadwood for a fire when the desert night cooled, Kharkh asked, *We hunt meat,* "Yessss?"

"Yes," I said. When they use the few human words they can pronounce to butter me up, I usually give in. Yhss signed a thank you and they whipped off up the canyon, green streaks in the twilight. Thunderclouds were massing in the southwest, promising a gorgeous sunset and the frail hope of rain. Gray veils of virge drifted down from the clouds, evaporating before they reached the ground.

OCallan dumped a small pile of dried twigs into the circle of rocks I had built. "Not much of a fire tonight," he said. "Where did the sorsh go?"

"Hunting for dinner."

He wiped dusty sweat from his forehead. "Will they bring us back something? I could go for meat instead of trail rations."

"No, they'll eat it when they catch it. Be glad. You don't want to watch them eat."

He looked a question at me.

"The pheromones released by terrified prey are crucial to their biological functioning. It isn't a pretty process."

"So if they don't get to hunt live meat, what happens?"

"They survive, but they go torpid." I could see his mind click over, filing away all this information. When the sorsh returned just before dark, long bellies bulging, mottled hides streaked with dark red, he signed, *Good hunt?* They saw, but they ignored him and settled to lick each other's skins clean while thunder racketed along the horizon.

With the daylight only a slice of orange behind uplifted mesas, a fat drop of water hissed in the fire. Then another, and another, and suddenly the bottom dropped out of the bucket.

"Shit!" OCallan hollered and jumped for his pack, drenched before he could get his rain poncho over his head. I sat there and turned my face to the rain, a blessing in the high desert. With the rubberized plastic poncho stuck around his shoulders, OCallan looked at me, water dripping from my hair and a crazy smile on my face, and threw the poncho off. He shrugged. "Guess I won't melt."

Lightning cracked, its image still on our retinas when thunder jarred the ground. Its wild energy uncoiled the sorsh, crests spread, talons extended, hissing with delight as they flung their long arms around each other's shoulders, leaping high and snaking low, circling in a desert dweller's dance to the lifeforce. In the electric strobes, they seemed demonic, all teeth and claws and slithering tongues.

OCallan was looking at them like he was remembering the monsters that hide under a kid's bed in the dark. When Sehn broke the circle and stretched out one hand, I pulled OCallan up with me. "Come on. Dance."

Wide-eyed and breathing hard, OCallan joined the sorsh. Kharkh slitted a grin at him and whirled through fighting moves, tuned to the rhythm of their dance. OCallan held his ground as Kharkh's claws cut the air bare inches away. Kharkh turned his toothy grin to me.

Stop, I signed. *Mine.*

Thought so, Kharkh signed and hissed his amusement. Laughing like idiots, we danced the rain, the sorsh flowing like liquid metal, and me and OCallan stumbling over the rough scree.

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I'm not sorsh, but I'm not immune to pheromones, myself. Nor was OCallan. His hair was slick to his head, his eyes wild, his wet clothes clinging to his body, a very good body, at that. He took my hand, pulling me into a close embrace that owed something to a tango, and much more to a different kind of dance. He wanted me. I wanted him. The sorsh were in favor. But then, they always are. They don't want to watch, but they do want to be within scent distance. They bask in the pheromones I give off. I don't mind; hell, why not? It's the closest they're going to get to sex on this planet.

You can always find an excuse for doing what you want. A lot of people make pheromonal decisions against their better sense. Thigh to thigh, mouth to mouth, touching in all the places our bodies fit, we stumbled back to OCallan's wet bedroll, sank down on it, and ripped a few buttons in our hurry to get flesh to flesh, an urgency intensified by the sorsh's reflected desire.

It wasn't love, but it was damn fine lust.

The rain had washed away Johns's scent trail. As the rising sun steamed the damp from our clothes, Kharkh sent Yhss down canyon to see if he could cut the trail. By the time he was back, we were packed up and ready to move, OCallan looking as if he felt as well-oiled as I did.

Yhss shook his long head, a human gesture that for some reason delights the sorsh. *No sign. Go further?*

OCallan was getting better at signs. "Is there any place Johns could climb out of this canyon?"

"A few places. Depends on how well he knows the country."

He scuffed the ground and looked up the canyon walls. "What would be the easiest route for someone who doesn't know the country?"

"Follow the canyon down to Lake Powell."

"And maybe catch a ride on a boat." OCallan rested his hand on the butt of his 12-gauge. "How far is it to the lake?"

"We could be to where the water backs up by late afternoon. A hard run, though."

"How far ahead is he now?"

I asked Kharkh. OCallan understood the signed answer. "If he's only half a day, let's get on it. I want this guy." He racked the slide on the P/P rifle.

Kharkh tilted his snout at OCallan. *Now he has fear.*

Water flowed in the creekbed and the air smelled like wet sage as we headed down canyon, moving fast and watching the ground since a broken bone would be real inconvenient at the moment. Kharkh ranged ahead, while Yhss and Sehn skittered up and down the canyon walls, searching for scent.

OCallan wound tighter, you could see it in the set of his shoulders. So far, he hadn't acted as if the terrorist we were hunting was armed and dangerous. Now he kept one hand close to the 12 gauge; the ready light shone on the stock of the rifle slung over his shoulder. Made me nervous. Why now? Why not all along? Johns could have circled back, set up an ambush at any time, and OCallan didn't know enough about the sorsh to know that they would give warning.

Hormones being what they are, I was fighting the desire to trust him. Sleeping with a man usually makes me think better of him, but I just couldn't get a handle on OCallan. Why would DOI Security send an HQ man on a

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field hunt? And why not a well-armed team, why just one man? OCallan's explanation that this hunt needed to be done quietly so as not to upset the tourists just didn't wash. If there was a tourist in this sun-blasted wilderness, they were damn good at hiding.

If Johns was a gunrunner, you'd think he would have resources, accomplices, access to comsat links and extraction vehicles. Maybe his Navajo heritage drew him to the wilderness, but then again, OCallan seemed to think that Johns wouldn't know the country, which argued against a man trying to disappear into his own territory. The questions were piling up, and I didn't like not having any answers. But I did like the idea of Dyarchic passports.

We ate on the move, chewing high-energy ration bars and drinking from our canteens. The canyon walls faded from dirty yellow to dirty gray, barren despite the waterfalls rilling off the rim of Black Point half a mile above the canyon floor. Heat sucked our sweat before it could cool our skin. The sorsh were darting from one boulder-thrown patch of shade to the next. Ravens sailed on the thermals, air riffling through their wings, their rusty squawking echoing in the silent distances.

It's hard to stay alert when you're moving through land that's two degrees hotter than hell. When Kharkh popped up in front of me, I jumped like a startled jackrabbit.

Prey is close.

I took two long, slow breaths to get my heartbeat back to normal. *Where?*

OCallan caught up. "What's happening?"

Since a short run for the sorsh was a day's walk for me, I'd insisted that the sorsh learn our distance referents. Kharkh signed, *Less/more than three miles.*

Glass flashed in OCallan's hand. "About three miles?" In his palm lay my sorsh sign dictionary. The back of my neck got tight. He put his hand on my shoulder and looked straight at me, his face serious. "I need this, Sonia. If we're going to take Johns, I need to be able to talk to them."

I stared at him until he took his hand off me. "You could have asked."

"Yes. I should have asked."

Damn straight. But this was not the time to get into that. According to Kharkh, Johns was holed up in an alcove on the north bank just beyond the beginning of the swampwater backed up from Lake Powell. He wouldn't be able to see us until we were well within weapon range, but OCallan was concerned that Johns had a clean field of fire across a hundred yards of undulating slickrock.

"I don't want the sorsh hurt," he said.

When the sorsh decided to *move,* they would cross that hundred yards in an eyeflick, but it was OCallan's hunt and it had been strange all along. I didn't protest, just let him lead off. Kharkh watched me, doubt showing in his orange eyes and half-raised crest. *You trust, female?*

Not much, warrior, I signed back. *Stay alert.*

Powell is a dead lake. The smell hits you first. The bloated carcasses of range cattle and a mule deer or two bobbed in the fetid water backed up Dark Canyon two miles from the lake itself. No reeds, no frogs, no tamarisk, even the ravens scorned the free meals nudging the shoreline. I've heard that Powell was a pretty lake, once; but now it's a sewer, blighted and noisome. Doesn't keep the boaters away, though.

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Trying not to gag on the stench, OCallan and I joined the sorsh who were gathered behind a large sandstone boulder at a bend in the canyon. Sehn lay flat on the sand. *Look.*

Peering around the boulder, following Sehn's pointing talon, I could see where Johns had gone to ground in a shallow cave angling back under a broad ledge of slickrock. *Not smart. No retreat,* Sehn signed.

There were enough large rocks on the alcove floor that Johns was hidden from view, but if the sorsh said he was there, then he was there. "So." I looked at OCallan. "How do you want to do this?"

OCallan wasn't grinning now. Any semblance of charm or friendliness had sloughed away like a second skin. Whatever pheromones he was putting out snapped Kharkh's head around, crest rising and hunter's senses refocused on OCallan. A long, slow hiss came from the sorsh's bare-toothed jaws.

"I'll give him one chance," OCallan said. He wound his arm through the P/P rifle's sling and braced the weapon against the side of the boulder. He fired off three quick shots, striking shards from the lip of the alcove. "Johns! This is Interior Security. Throw down your weapon and come on out."

Silence from the alcove.

OCallan walked three more shots across the back of the cave. "Come out, you son of a bitch. If we have to come up there and get you, you're dead."

It sounded like the truest thing I had ever heard him say.

Johns's voice was tiny in the distance. "Don't shoot me. I'll come out if you don't shoot me."

OCallan's smile was nothing but bare teeth. "Get your sorry ass out here."

A dark figure stood up in the alcove. His hands were spread wide. "I don't have a gun."

OCallan didn't relax his shooter's stance. "Walk slow. Keep your hands where I can see them." He nodded at me. "Send the sorsh out to get him."

They were intent on OCallan. I clicked my tongue for their attention and signed, *Go. Take alive.*

Something wrong here, Kharkh signed.

Johns was starting to stumble his way down the slanting rock. Heat waves shimmered him into a scarecrow figure as he walked into OCallan's sights.

Go. Now!

They went, flowing over the rock like green water. When Johns saw them coming, he froze. A strangled scream pierced the hot air. Yhss and Sehn each grabbed an arm, stretching Johns's body between them. Kharkh touched his handclaw to Johns's chest, five bright drops of blood appearing on Johns's dirty blue shirt, marking the man as warrior's meat. Kharkh shrilled a victory cry, but it was halfhearted, form more than substance. Sehn and Yhss were silent.

They were right. This was too easy. At fifty yards, the details that came into focus showed a frightened, bruised, and beaten man, the leather of his city shoes shredded, his belt pulled tight against the gauntness of hunger. His body was soft, a man who made his living sitting in a chair. His face was pulled into a rictus of fear, his eyes darting from one sorsh to another, white showing all around. He keened a continuous soft cry, the terrified wail of a man pushed beyond all endurance.

If Johns was a terrorist gunrunner, I was Betty Crocker. I swung on OCallan. "What the hell is going on here?"

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OCallan relaxed his stance, keeping the rifle at ready. "With your help I've accomplished my mission."

"Which mission was that?" I signed the sorsh to stop, wait. "You want to cut through the lies? Who is Johns? Why are we hunting him? He's no terrorist gunrunner."

OCallan tilted his head, his lips parting in a soundless laugh. "No, you're right there. A little trouble with the IRS and he got a choice: jail or cooperation. He was a convenient test case. A laboratory rat, if you will. He served his purpose." Then he raised his rifle and shot Johns square through the heart.

As Johns's body sagged in their grip, Yhss and Sehn went lizard-still. Kharkh, halfway between us and them, also went immobile, his crest fully raised, long tongue flickering.

"You bastard. You vile piece of shit."

OCallan kept his rifle trained in the direction of the sorsh. His smile twisted. "Just doing my job, Sonia. Have you figured it out, yet?"

Yes, and damn me for an idiot for not figuring it out sooner. "You want my sorsh."

He nodded. "You sorsh runners are loose cannons. DOI wants sorsh hunting abilities, but we want them under our control. We can create the pheromones in a laboratory, and I've learned how you handle them."

"And that's why you didn't want them to win the Triathalon. If they were the new champions, you couldn't make them disappear." The sorsh's focus was intent, a kind of electric aura that presaged violent action. The tip of Kharkh's long tail twitched. "You'll never get them back without me. You take your eyes off them even once and they'll kill you so fast you won't even know it happened."

"You think I'm stupid?" His twisted smile faded. "I don't intend to get them back without you and I don't expect your help. A jumprig will be here within half an hour of my signal. Cages, tranquilizers, I think we can handle them."

"Why this charade? Why didn't you just ask for a demonstration? There's a planetful of sorsh out there, you don't need my team."

"DOI had to see them in action. Had to see how you do it." Keeping his rifle on the sorsh, he dug a comsat link out of his pack. "I'm sorry it has to be this way, but you have to face it, sweets, this is no longer your sorsh team."

"Like hell." I went for him and he swung his P/P to target me. I froze. The black hole in the end of the barrel looked as big as death.

He still didn't understand the sorsh. Kharkh was ten yards off, and Yhss and Sehn farther yet. OCallan felt safe, his weapon on me, his finger tight on the trigger.

With the smell of my fear in his slit nostrils, Kharkh *moved,* an explosive saurian leap that hit OCallan in the chest, the rifle clawed from his grip, blood leaking from a punctured carotid artery. Kharkh slammed OCallan to the fried sand, one scaled knee on OCallan's chest. Then Sehn and Yhss were there, pinioning OCallan's outflung arms.

OCallan's face was blank with shock, his jaw working, but no sound making it out of his mouth. Bright blood pulsed. Kharkh's thin tongue flickered just short of the growing scarlet pool at the base of OCallan's throat. All three sorsh looked at me, flat-eyed and trembling. "Yessss?" Kharkh said.

Maybe I shouldn't have let them kill and eat OCallan. I've since thought

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it sets a bad precedent, but the truth is that the sorsh already consider all humans except me as prey anyway. At the time, it seemed the thing to do. I wish I could regret it. I didn't watch, and I tried not to listen as I scratched out a shallow hole in the sand and buried Johns's body. If that was his name. He had no ID papers, no wallet full of credit chips, no holos of friends or family. Poor lab rat, I wondered if he even knew why he died.

We took OCallan's gear and weapons and what was left of his bones, tossed them down a slot canyon, then made our way back to Kigalia Station. The old ranger didn't ask what had happened to OCallan, and she only watched with a grim smile while I smashed her comsat link and loaded some provisions in the SUV. She shook my hand as we left.

I figure we've got a couple of days until DOI gets nervous and starts looking for OCallan. When they find what's left of him, they're going to see the toothmarks on his bones, and they're going to know that he wasn't chewed on by any coyote or mountain lion. With Dyarchic passports, we've got just enough funds to get off-planet before somebody starts asking rough questions. And I guess we'll go back to making our living as a hunter team. It's what we do best, it's what the sorsh *need,* and I wouldn't mind seeing some of the rest of the galaxy myself. O

FIRE ON ICE

The moon Europa: Jupiter's pale bloat glinting yellow off frozen seas.
You worry over vacuum and cold, not fire. But to live off Earth
you need oxygen, and oxygen is hungry, hungry for fire.
Even metal burns, given heat and oxygen—metal
like our buildings of freshly minted aluminum.
When we finally got the outside water pump
unfrozen, it sprayed a rain of snow on the
inferno. Snow is seven-eighths oxygen:
in the bright blue aluminum light
we watched that oxygen burning
in the terrible heat and cold:
in our heads we did the
calculations, and we
watched ourselves
dying in the light.

—Joe Haldeman

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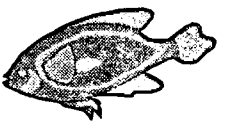
HAWK ON A FLAGPOLE

Tim Sullivan



Tim Sullivan is the author of seven novels, including *Destiny's End, The Parasite War,* and *Lords of Creation,* and the editor of two horror anthologies. A frequent book reviewer for the Washington *Post,* he is also a screenwriter, director, and actor. Mr. Sullivan currently resides in Los Angeles, California.

The Alagash River makes its icy way along the Canadian border at the tip of Maine. It's a narrow, but deep, winding lane of clear water that cuts through gray rock and miles of heavily wooded land, separating New England from New Brunswick by just a few yards of cold, black liquid.

My best friend Dan Blanchard and I were only fourteen when Dan's dad, Leon, took us on a hunting trip up there, along the Alagash River bank. He had obtained the use of a cabin owned by the company he worked for, a paper manufacturer. Dan's mother had come with us as far as Fort Kent, where she would stay with relatives while we hunted. It was early November, and there was already some snow on the ground, white patches separated by evergreens and birches.

"We're almost there, boys," Leon Blanchard said, as he turned onto a bumpy dirt road. Dan's plump cheeks trembled as we held on while the car lurched along a two or three mile stretch.

Then the trees began to thin as we neared the river, and we saw the little yellow cabin for the first time. Between the cabin and the river was a flagpole, and as Leon Blanchard pulled the car around toward the cabin to unload, I saw that there was no other sign of man anywhere in sight. No building, no road, not even a telephone pole. Just a cabin and flagpole. We were alone.

It smelled of pine as I got out of the car and stretched. We had begun our drive at Bangor early in the morning, and now it was late afternoon. Pines cast long shadows across the ice on the river. Ice? This early in the season? I could see white chunks floating by as I helped Dan carry our blankets and gear, while Leon unlocked the cabin and cleared the way. We went back for a second load, and Dan's blond head darted in front of me as he started to grab the rifles, which were wrapped neatly in canvas.

"I'll get those, Danny," Leon said.

Dan frowned, and his hand lingered on the canvas for a moment, but he gave up on the guns a few seconds later, seeing that his father stood watch-

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ing him on the top step leading to the cabin's only door. He carried in a bag of groceries instead.

"There's plenty of firewood in the shed around the side," Leon told us as soon as we'd brought in everything from the car. He was fussing with an old black iron stove. The only other furnishings were bunk beds, a rocking chair, a stool, a cabinet, and a little nicked wooden table. "Why don't both of you go get an armload?"

"*Now,* Dad? It's still daytime," Dan protested.

"Not for long." He pointed outside. "Look at how the light's changing already. And once it gets dark, it's going to be really cold. So get going. You'll see the outhouse back there, too, if you need it."

We went out to get the wood, energized by the crisp air. Around the side we found a stump with an axe blade partly buried in it, and a little lean-to up against the cabin that covered a stack of split logs, so that the firewood was pretty well shielded from rain and snow.

"I'm going to kill something tomorrow," Dan said. "Do you know that?"

"Maybe you'll get lucky and squash a beetle with your bootheel, Dan."

"Ho, ho. I bet I get something before you do."

"Depends on what we run into, I guess."

"The chipmunks are all yours, buddy. I'm after bigger game."

"Expecting lions and tigers and bears, Dan?"

"Maybe bears, wise ass."

Dan loaded up my crossed arms with wood, and snatched a couple of splits himself. We took them in and found Leon already burning some old newspaper and cardboard under pine branches, starting the fire.

"Let me have those right over here." He pointed at an iron cradle next to the stove, to put the wood in. We dumped it there, and he gently took the top split and laid it over the kindling, then crossed another over that, and a third over that. The paper burned, the pine needles popped and exploded into flame, and in a few minutes he had a good fire going.

There were two bunk beds, and Dan claimed the top one right away. Leon would sleep on a cot by the door, leaving just enough room for us to get by if we had to go to the outhouse in the middle of the night. The fire warmed the little enclosure quickly, and we played cards for awhile, and went to bed after that. I hoped I wouldn't have to go out, not just because it was nighttime, but because it was so dark, and because it was more silent than I had ever imagined a place could be. But the woodsmoke smelled rich and comforting, and Leon took it all in stride, this camping business, so it didn't seem all that frightening. I knew that Leon Blanchard had once been a hunting guide, long ago before I was born, and before he had settled down with a wife and come to live in the city, got a job and became respectable. Dan had been born late in his life. Leon was about sixty now, but he didn't look it. He was rangy and hard looking, with a lean face and big, powerful hands. He had a slight limp, and he had a finger missing . . . the index finger on his left hand.

In spite of his appearance, though, he was a nice man, always kind to the kids who came by the Blanchard home to hang out with Dan; a steady sort of parent and spouse, who provided well for his family, constantly worked on the garden or on an addition to the house, and had a sense of humor. If he had a flaw, it was that he could deny his son nothing. My parents thought Dan was a little spoiled, the way Leon doted on him. But they liked Dan, and they would have been the first to admit Leon Blanchard was a good man.

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So, with Leon barring the way of all intruders, I slept soundly enough.

There's something about sleeping in the wilderness that turns your imagination dark and primal. The hoot of an owl takes on tremendous import in your dozing mind, and you become fearful at the susurrations of the trees outside your window. And there was the constant rush of water from the river, just beyond the thin wall of the cabin. How many people had drowned in that deep channel over the years? How many shot and killed in hunting accidents? How many mauled by bears? How many murdered. . . ?

What unknown things might be out there, lurking in the dark? And it was *so* dark, the fire giving off hardly any light at all, and even that soon dying down to a few orange embers.

And then I remembered that I was going to try and kill an animal tomorrow. . . .

When I woke up, the fire was dead, my face was cold, and there was a faint grey light seeping through the window. Worse, I had to pee real bad. I got out from under the covers, shivering in my long johns, and put on my pants, flannel shirt, and pack boots as quickly as I could. Dan was still sleeping, but Leon had gotten up, folded the cot, and was not inside the cabin.

I was too desperate to wonder where he'd gone. I just hoped he wasn't using the outhouse. But then, I supposed I could go behind a tree, if necessary.

There was no sign of Leon when I got outside. I did my business and went back into the cabin, carrying a few more pieces of split wood with me. A wonderful aroma surprised me as I entered. Leon was cooking fish in a skillet over the revived fire.

"Good morning, Jim," Leon said. "You're just in time for breakfast."

"Great, Mr. Blanchard. Did you catch those this morning?"

He laughed. "No, my nephew in Fort Kent caught 'em a few days ago, and kept 'em on ice for us."

"Smells real good, Dad." Dan was propped up on one elbow in bed. He threw the covers off and started to get dressed.

"Well, they're just perch, but they ought to be filling enough, especially with these biscuits your mother made. There's some instant coffee here, and some MacIntosh apples, too, fresh out of the orchard."

After we had eaten and cleaned up our tin cups and plates, Leon asked us if we wanted to raise the flag.

"Is there one here, Dad?" Dan asked, sounding pretty unenthusiastic.

"Sure is, right over there in that cabinet."

"But why do you want to put it up?"

"Because we're Americans."

"Well, yeah, but . . ." We all knew that Leon's reply wasn't just jingoism. We were right on the border, and the river could easily be forded.

"Flying the flag, along with the wood smoke, will show anybody coming down the river bank on either side that somebody's staying in this cabin, representing the company. All the people around here know that the Great Yankee Paper Company owns this land."

"There are people around here?" I asked.

"You'd be surprised, Jim," Leon said, smiling.

"I sure would. We haven't seen anybody since we left Fort Kent."

"There are hunters and trappers out there, on both sides of the river. They've been known to squat in this cabin, but the company sends people here from time to time to make sure there's no trespassing."

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"They're not supposed to hunt on this land?"

"They can hunt, but they're not allowed in the cabin. Breaking and entering's the only way in. People have been arrested for that."

For a moment, I had a terrible vision of us coming up on the cabin yesterday afternoon, dying in a fusillade fired by renegade trappers from the window of the cabin as we approached. "How did you know there wouldn't be some squatters when we got here yesterday?" I asked, my voice trembling a little.

Leon pretended not to notice. "I didn't know. But it's our job to see that the cabin is all right. Now that we've done that, we can enjoy ourselves."

"I'm glad you didn't tell me that last night, Mr. Blanchard."

"How come?" Dan asked.

"I might've had nightmares."

"Pansy," said Dan.

I must have gotten a little red-faced, but I didn't say anything.

"Shoot! We could have had a gunfight. Blown those Canucks to bits." Dan crooked his elbows as if to lift a rifle, and pretended to pull the trigger. "Pow!"

"Don't be silly, Danny," his father admonished him. "We'd just ask them to leave."

"And what if they didn't?" Dan asked.

"Then we'd go back to Fort Kent and get the authorities to clear them out. But they'd go without an argument, most likely."

"Most likely?"

"You never know for sure," Leon said. "Some people might put up a fight. Once there was a fella who was wanted for robbing a store in Edmundston. He forded the river to get across from Canada, and ended up here, where the constable found him and brought him in."

"Did they shoot it out, Dad?" Dan asked.

"I don't think so . . . but I could be wrong. There are some bullet holes in these walls, filled in with putty. Could have been a few shots fired."

Leon's story was pretty exciting. He had a nonchalant way of telling it that made it seem very real and immediate. Of course, if the constable hadn't exchanged gunfire with the robber, then the bullet holes had been put there by somebody else, maybe just passing by. I'd seen road signs like that, peppered with bullet holes. If that were the case, somebody could just shoot us right through the flimsy cabin walls at any moment. I started to feel claustrophobic.

"Want to get started?" I said.

"Hunting?" Leon said. "Sun's up, and so are the deer."

"Yeah," Dan said. "Let's go get something."

"You boys go ahead. I've got some things to do."

The flag forgotten, we threw on our coats and burst out the door a few minutes later, two mighty hunters armed with rifles almost as big as we were. Dan held a 30.06, and I carried my father's Mauser. There was frost on the ground, along with clumps of snow, but the sun was already starting to warm things up a bit. It felt great to be out in that clean air, the blue sky above us, the water rushing by, carrying flowing chunks of ice along as we crunched through the underbrush a few yards from the river. It was so still and clear and fresh and beautiful that I was overcome for a moment.

"Wow!" I exclaimed. "Look at this place! Even the air smells good!"

"Quiet down, asshole!" Dan shouted at me.

"Who you callin' asshole, sissy boy?" I said.

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"You'll scare all the game away," Dan replied, by way of explanation.

"I don't see any game."

"It's never far away around here," Dan said. "Dad told me so."

We resumed walking to the west, the sun at our backs.

"What kind of game are we looking for, Dan?"

"Any kind."

"Did Leon ever shoot anything around here?"

"Yeah, he killed some partridges."

"We can't shoot birds with these rifles," I said.

"We're looking for bigger game, all right," Dan replied. "Deer, or even a bear."

"I don't think we'll see any bears."

"They come after people's garbage. They're around."

"Sure."

We had moved a little farther away from the river, where the woods grew thicker. A fallen tree made a kind of bridge on which a squirrel sat, staring at us with its tiny black eyes.

"I'm gonna git him," Dan said.

He clicked off his rifle's safety, and took careful aim. There was a long pause, in which nothing happened. There was no sound, except for the faint shush of the river. Then a crack so loud it felt like the skies had opened up for Judgment Day. The fallen tree shook. Wood chunks flew. The terrified squirrel leaped into the air, and was out of sight in what seemed a fraction of a second. Almost as if it had never been there at all.

"Sheeit . . . missed him." As Dan lowered the rifle barrel, I saw a wisp of smoke escape from the barrel. I took in the frowning Dan and his gun, and the splintered spot a few inches from where the squirrel had watched us. It should have been funny. I tried to make it that way.

"Well, there goes your big game, Dan."

I had him squirming. "Didn't miss it by much."

"There wouldn't have been anything left to the squirrel, Dan," I said. "Look at what that bullet did to the tree."

We moved closer to the dead tree and took a look. There was a deep, splintered gouge, as if some unholy monster had taken a bite out of the trunk. It was pretty awesome, all right, the power of that rifle.

"Just imagine what this could do to somebody's head," Dan said, holding up the rifle for my inspection. "It would blow it right off!"

"Yeah." Dan was getting kind of creepy. Maybe he'd been watching too much TV, or something. I didn't want to think he was serious.

"You weren't really trying to hit the squirrel, were you?" I asked.

"Well, yeah, kind of."

"Oh, man . . ."

"It was a pretty small target," Dan said with indignation. "I'd like to see you hit it."

"I wouldn't even try."

"Why not? Chicken shit?

"Chicken shit? It was a *squirrel!*"

"So what? You couldn't have even come close."

"Yeah, right. Are we hunting, or are we arguing about shooting a squirrel?"

"What's wrong with shooting at a squirrel?" Dan demanded, red faced.

"You can't eat it!"

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"Sure you can. People eat squirrels all the time."

"Maybe if they trap them, or shoot them with a small bore rifle."

"I plan to hit something today, and if you're gonna be a wimp about it, go back to the cabin."

"Just don't blow your foot off."

He turned away from me for a moment, and when he turned back he had a look in his eye that I didn't much care for. "You know what we should do?" he said. It wasn't really a question, I could tell.

"No. What?"

"We should have a war."

"What are you, crazy?"

"Yeah, and I've got the American gun, so you'll have to be the Nazi."

"Don't even joke about gunfights, Dan. These guns are dangerous."

"That's the whole point, ain't it?" He laughed and pointed to the south with his rifle barrel. "Come on. You go that way, and I'll hunt you down, Nazi butcher."

He'd definitely been watching too much TV. I decided to play along. "What's to stop me from circling around behind you and getting the drop on you, pardner."

"No, no, not western talk. World War II."

"Sieg heil." Action shows were just about all we watched in those days, and we had been watching them since we were old enough to whine and cajole our parents into letting us stay up late. Westerns and war shows. *Combat, Johny Ringo, The Gallant Men, Have Gun—Will Travel, Wanted Dead or Alive* . . . or detective shows like *Peter Gunn* and *Richard Diamond.* What they all had in common was fisticuffs and gunplay.

"Well, you want to do it?" Dan taunted. "Or are you gonna go back to the cabin and ask Dad to wipe your butt."

"I thought you were the only one he had to do that for."

Dan didn't care for my snappy comeback, but let it slide as he persisted in taunting me.

"A little war right out here in the woods," he said. "Won't that be cool."

"Yeah, well, go get ready for your little war. If I don't show up in ten minutes, start fighting without me, okay?"

"I knew you'd weasel out of it!" he said with triumphant glee. "I knew it!"

"Your old man would kill us if he caught us doing that," I said, "and you know it."

"He wouldn't know what we're doing. If he heard gunshots, he'd think we were shooting at a rabbit, or something."

"Dan, these are *real* guns."

"What fun would it be if they weren't?"

"Look, Dan, this isn't funny. Just because you missed that squirrel, you think you have to do this?"

"Get moving!" he said in a threatening tone. I wasn't sure if he was pretending or not. Dan could get himself to believe some pretty weird things sometimes. I really didn't want to turn my back on him. Who could tell what he would do next?

"Age before beauty," I said. He was three months older than me.

"You think I'd let a Nazi shoot me in the back?"

"I'll follow the rules of the Geneva Convention," I replied.

"Just like you did with those concentration camps," he accused. "Now get going before I take you as a POW right here."

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"How will you do that, Dan?"

"I'll disarm you and take you back to our bivouac."

He was trying to get my back up, but this was just too stupid. I refused to play. "Here you go, Sarge. I never liked Hitler anyway. Can't wait to get fat eating prison food."

I handed him the rifle.

"Oh, come on!" he whined. "Let's have some fun, Jim."

"We're supposed to be hunting, not trying to kill each other."

Before anything else could be said by either of us, the sky darkened. I knew right away that it was no ordinary cloud. The shadow was accompanied by a hissing. I looked up and saw something pass overhead, something very large, but I couldn't tell what it was. I felt a weird vibration, not just coming from the sky, but from below and from all around. It was gone in an instant, and so was the shadow, but there was a strange, discolored streak up above where the shadow had been. A swath of sky seemed lighter than it should be, and it flickered as if my eyelids were fluttering. But a moment later the streak blended with the blue of the sky and faded, along with the flickering.

"Did you see that?" I asked.

"It was a plane, wasn't it?" Dan asked. But he didn't sound as if he really believed it.

"I don't know. I didn't get a very good look at it."

"Think it was like a secret weapon, a new jet or rocket or something?"

"Couldn't tell you." I remembered that there was an Air Force Base in northern Maine, an early warning station near Presque Isle; but my dad, an Air Corps man during the war, had always told me that the planes went from there out over the Atlantic, rather than flying inland. Not only that, but whatever had flown over left nothing behind, other than that quickly vanishing streak. A jet would have left a long white contrail.

"Maybe it was a Russian spy plane," Dan speculated.

"Or a meteorite," I said.

"A meteorite!" Dan laughed at me. "I hope the Blob's not inside it."

I kind of hoped that the Blob *was* inside it, but I'd had enough ridicule for one morning. We headed back to the cabin, to see if Dan's father had seen the thing in the sky, or at least felt its vibration.

"Hello, boys," Leon said as we clambered up the steps and into the cabin. "Been around Robin Hood's barn?"

"Dad," Dan cried, "did you see that thing? Did you hear it?"

To my great disappointment, Leon had noticed nothing. He sat in the rocker, some papers spread out on the little table in front of him, fountain pen in hand. "No, I didn't hear anything."

Dan and I chattered on about the thing, but Leon remained unimpressed. "It must have been an airplane," he said. "Every now and again one will be heading over the pole to Bangor, or even Boston, and fly right overhead."

I wanted to tell him about how it seemed to be all around us, that vibration. And the flickering. Whatever it had been, it didn't seem to originate from above; it was as if the thing in the sky was only part of it. Just the part we could see. But I kept my mouth shut about that. I knew it would have sounded silly to Leon. It sounded silly even to me, and I *wanted* to believe I had seen something extraordinary.

"Jim thinks it's a meteorite," Dan said in a mocking tone.

"A meteorite," Leon said indulgently. "Well, who knows? They do fall all the time, but most of them don't make it all the way to the ground."

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"That's right, Mr. Blanchard," I said. "They burn up in the atmosphere, don't they?"

"Yup."

"Well, this thing was pretty close," Dan said.

"Maybe it was a flying saucer," Leon said, completely straight-faced.

Of course, that was what I had been thinking, but it sounded so idiotic when Leon said it that I was glad I'd kept quiet about that particular theory of mine. Leon was a man of the earth, and I was sure he didn't believe in flying saucers. It wasn't for a couple of decades to come that many people commonly accepted the existence of UFOs. And as for Dan, at least he'd forgotten about playing John Wayne to my Peter Lorre.

"Yeah, Dad," Dan said, looking at me with an annoying smirk. "Maybe we can shoot a Martian and tie him to the hood of the car."

"Maybe." Leon's brow wrinkled in thought as he marked something on one of the papers with his fountain pen, effectively dismissing further talk about flying saucers and Martians. "We'll have lunch in a couple of hours," he said before shutting us out completely.

Leon meant for us to go back outside. I had it in mind that we might see some other sign of the flickering thing that had so changed the character of that cold morning, but Dan didn't want to talk about it anymore. He'd gotten the hint from his father that it wasn't a subject worth pursuing.

"Let's go this way," Dan said, still trying to be the leader. He was pretty subdued by now, though.

"Okay." I played along, but I enjoyed imagining that something was watching us from the woods as we stalked game along the riverbank. I'd much rather play alien invasion than Nazis and GIs, anytime. Or hunter, either, for that matter. Dan had a passing interest in science fiction, but was never fixated on it like me. Adults made kids think there was something wrong with them if they paid too much attention to the fantastic, back in those more pragmatic times. *Playboy* wasn't the only thing I read under the covers using a flashlight, believe me. It seemed that my rampant imagination stuck out just as far as my youthful libido. And that was pretty far.

"Did you feel the way everything shook when that thing passed over us?" I asked.

"Jets always do that," Dan said, a little too quickly.

"I've seen the Blue Angels, but they were never like that thing," I said.

"Sure. Right. Be quiet, will you?" Dan was getting angry, probably because the thing had frightened him. Or maybe I was just talking too much. We were, after all, supposed to be hunting.

So I stopped talking, and crunched through the underbrush with Dan, hoping to see something else. . . . An alien, say. But what if we did see one, and they were dangerous? What if they had heat rays, and blasted the meat right off our bones, like in the "Mars Attacks" cards? Would we be able to fight them off with our primitive weapons?

By the time we unwrapped our tuna fish sandwiches for lunch, we still hadn't seen any sign of a flying saucer or an alien. I hadn't really expected to, of course. After lunch we wandered down the opposite way, to the east. No spaceships or Ganymedeans down there, either.

As the shadows lengthened, and we continued to frighten game away with our noisy passage through the brush, it occurred to me that the visitors might not be aliens at all. They might be from another dimension, like that little guy who was always harassing Superman, Mr. Mxyzptlk. Or

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maybe they came from the center of the Earth. Or maybe the flickering vibration might be some creation of Earth scientists gone bad. Radioactive mutations. Although in most of the double features I'd seen, the latter seemed to thrive in the desert, not in the Maine woods. Of course, *those* were only movies. . . .

Exhausted from tramping around all day, we returned to the cabin. We'd never really wandered very far from it.

Leon cooked steaks for us over the open flame. They were delicious and much appreciated, though he insisted we eat some canned spinach with them. Despite Popeye's admonitions, I'd never liked the stuff. I washed it down with black coffee brewed in an old fashioned metal pot.

It was dark and we were in bed before long. I was tired, but as I lay there under the covers in my long johns, I couldn't get to sleep. While Leon and Dan snored, I wondered what was going on just outside the cabin, a few feet away. I knew that none of my suppositions about the thing we'd seen this morning were correct. It was something nobody knew anything about, something from someplace or some time that was a mystery. Whatever it was, it was here now, and out of three people, I was the only one who realized how important it was. Dan had seen it, but he didn't want to think about it. Leon hadn't even noticed it. Maybe a third of the population would be able to recognize its significance, then. Or maybe I was the only one on Earth who had any idea. . . .

I might have nodded off once or twice, I'm not sure. But I didn't get much sleep, of that I'm dead certain. And then I felt the first tingling in my crotch. I was going to have to go to the outhouse. I held out as long as I could. But I knew I'd never make it till daylight.

What was I afraid of? There hadn't been any bears around last night. Why would they come tonight? We hadn't left any trash outside. What other danger could be lurking. . . ? Besides maybe the denizens of that thing we'd seen in the sky, that force we'd felt shaking us. . . . The flickering . . .

I threw the covers off and slipped out of the lower bunk. It took me a few minutes to get my boots on, but I could see my coat by the light of the dying fire. I put it on and slipped past the snoring Leon. Opening the door, I went out, quietly closing it behind me.

I crossed my arms and slapped at my shoulders to fight the cold, and hustled around toward the outhouse. A gust bounced off the river and chilled me straight to the bone. When I touched the hook on the outhouse door, my bare fingers recoiled from the frigid metal. A moment later, though, I was snugly shivering in the little wooden cubicle.

As I stood there relieving myself, I saw something through a chink in the outhouse wall. It was glowing the same flickering light as the streak in the sky, only it was right nearby—and it was moving. Just outside the outhouse. I was scared.

And then I caught a glimpse of something. A distant bright semicircle rippling, refracted through an aqueous haze that was my home. Utter silence. I was drifting through it with such ease, it was wondrous.

The vision left me as quickly as it had come. I had to steady myself with one hand against the rough pine of the outhouse wall. But I knew what I had been for that brief moment.

"A fish. . . ."

I had been a fish, swimming under the river's surface a few dozen yards away, seeing the crescent moon from below the surface. But how? I was

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sweating inside that chilly little chamber, afraid of whatever was outside, whatever could put me into the brain of a fish. But now I didn't see anything move. It took me a long time to come out. But I knew I had to, or freeze to death. I cautiously opened the door and peeked outside. Seeing nothing, I stepped out onto the cushiony path of flattened brush leading to the cabin. I stood there for a few seconds and checked every direction, but nothing stirred.

At last I looked up and saw the moon through the boughs of a fir tree. Was that all I had seen, shadows in the moonlight? There wasn't much illumination in this early phase of the moon. But what about being a fish underwater? A hallucination? Maybe I was still dreaming. Whatever it was, I didn't want a replay just then.

I ran to the cabin and got back into bed. I didn't sleep at all the rest of the night.

At dawn, Leon cheerfully assembled a breakfast of bacon and eggs, seeming to be unmindful of my exhausted state. As we ate, we talked a little, or at least Dan and Leon did.

"Dad, how come you're not hunting with us?" Dan asked.

"Oh," Leon said, handing me a warm biscuit to go with my eggs, "I've done enough hunting in my time, Danny."

"I know, but you *really* know how to do it."

"And you fellas don't?"

"Not all that well," I said.

"Well, it takes some patience," Leon said. "You'll get the hang of it, though, if you really want to."

"We haven't even seen anything," Dan complained.

"Well, animals don't usually come out and stand in front of you, waiting to get shot. You have to go where they are. And you have to be quiet. They hear pretty well, just like your dog."

We soon had our coats and boots on, and were out the door, leaving Leon with his copy of *Dr. Zhivago* until lunch. He was probably relieved that we were out stampeding squirrels rather than asking him silly questions.

In the daylight, the event at the outhouse didn't seem so real. I felt a little less spooked, though I lagged behind Dan, who had apparently slept pretty well. This time we went to the east again, seeing how far down the river we could go before the shadows got short.

About an hour or so after we set out, I heard voices. I started feeling anxious, but soon saw that it was no hallucination. A bright orange hat and vest showed through some branches. A man carrying a rifle over his shoulder, like a soldier, emerged from the woods, and a moment later a young guy followed with a doe wrapped around his neck, the animal's dead face staring upside down and swinging at his midsection, while he clasped her legs with both arms, holding her hooves together.

"Come on, Jean-Paul, we're almost to the river," the older man said.

He turned around and saw us. "Hello, guys." he said. "Didn't know anybody was down here."

"Yeah, we're staying in a cabin back there," Dan said.

"Oh. Does that belong to the paper company?"

"Yeah."

"Well, we thought we might dress this little doe here and wash off the meat. I don't want Jean-Paul to have to carry the thing all the way back to the car in one piece. It's a couple miles."

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"Think he'd make it that far?"

"I'd make it, sure." Jean-Paul said in a pronounced Quebeçois accent. "It's my job."

"He's little, but he's tough." The older man smiled. "I've been coming up here from Philadelphia for years. Used to hire Jean-Paul's papa as a guide, but he's getting old, so now he sends his boy out to do the job."

Jean-Paul was probably no more than a year or two older than Dan and me, but his dark eyes showed no childishness under his shock of unkempt black hair; his aquiline features were somehow those of a man even though they were as yet unlined. His face was dirty, and his hands were caked with dried, black blood.

"My name's Danelli," the older man said, reaching out to shake my hand and then Dan's. Jean-Paul carried the deer to the riverbank and slung it down. I turned away as he took out his hunting knife and went to work. Even though I didn't watch, it didn't help. I could smell the deer's guts.

We introduced ourselves to Mr. Danelli, and chatted uneasily for a few more minutes, and then decided to turn back. It was getting cloudy, and we thought it might snow. Dan didn't know if his father's car had chains on the tires, and there was a chance we could get stuck here in the woods if there was a blizzard today.

Dan seemed troubled as we hurried back to the cabin. Maybe he was learning that he wasn't quite the killer he thought he was. Or maybe he was imagining his dad as a young man, flecked with grime and gore, lugging and butchering a deer for rich city people who liked to play at roughing it in the north woods. I don't know what he was thinking. Maybe he was simply worried about the weather, just like he said.

"Hey, Dan, slow down, will you?" I asked. "I'm tuckered out."

"You pussy." Now that was more like the old, lovable Dan.

"Really, Dan, I'm tired. I couldn't get to sleep last night."

"Oh, yeah? How come? I slept like a baby."

"I don't know. I went down to the outhouse. . . ." Should I tell him what I'd experienced? No. ". . . and when I came back in, I couldn't sleep."

"Okay, let's rest a minute." We squatted by the river and gazed across at the Canadian wilderness.

"Look at that," Dan said. He pointed to the northeast.

"What?"

"On that treetop over there."

Sure enough, on the tallest pine in sight, a bird roosted, from our vantage a tiny, dark shape that was barely identifiable. "Is it a hawk?"

"Sure is." Dan hefted his rifle. "Think I can hit him from here?"

"No." It didn't seem right to me, to shoot at something on the Canadian side, at a bird you couldn't eat. And the hawk was very far away.

After a few minutes we got up and continued walking back to the cabin. A few stray snowflakes tumbled down to the ground. "Uh, oh, here it comes," said Dan.

"Maybe it won't be that much," I said.

We stepped up our pace. When we got to the cabin, I noticed the hawk again. He landed on another tree top across the river, closer this time, as if he were following us. Dan, intent on the falling snow, didn't look across the river before he went into the cabin, and I didn't say anything to him about the hawk. I followed Dan into the cabin.

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Leon was already packing up. "Hi, boys," he said. "Looks like we better get ready to go. Snow."

"Right, Dad."

I started to unload my gun, putting the bullet from the bolt action Mauser on the little table, standing it on end like a miniature rocket. Dan set his rifle by the door and started to roll up the blankets.

"Think we'll get stuck here?" Dan asked his father.

"Oh, no, we'll be back in Fort Kent before there's much snow on the ground. If we have to, we'll stay overnight at your aunt's. If there's a lot of snow, I'll buy some chains there tomorrow. We'll make it home. Don't worry."

I put the remaining food in a paper bag, and we started to carry things out to the car. Leon opened the trunk, and went back inside to make sure we'd got all our things. In a few minutes we were ready to go. I had leaned my rifle against the car, waiting for Leon to bring out the other rifle.

"Looks like we got everything, boys," Leon said as he came back out. He was carrying Dan's rifle. He was just about to lock the door when he was distracted by his son.

"Look!" Dan shouted. "There's that hawk again!"

Leon and I looked up where he was pointing. There indeed was the hawk, sitting majestically on the flagpole outside the cabin, gazing down at us.

"Shoot it, Dad!" Dan said.

"What? You want me to shoot it?"

Dan seemed confused by Leon's question, and he looked at me. I didn't say anything. He repeated: "Yeah, shoot it."

"You're sure?" Leon looked very serious.

"Yeah, shoot it before it flies away."

"I'll have to get a cartridge."

"No." Dan's face was flushed, trembling, pink with the cold and the excitement. "I forgot to unload the rifle."

Leon lifted the rifle and checked the chamber, clicking off the safety. He put the gun butt to his shoulder and took careful aim, squinting his left eye shut. I glanced back up at the hawk, and knew that it did not understand what was happening. I looked at Dan and saw him gazing adoringly at his father.

A flickering.

Something happened to Dan. His eyes glazed over, became blank and he was somewhere else for an instant. Then he was back. He was confused and frightened.

The flickering came again.

And then I wasn't there. I was up high, looking down at the world. A bare patch by the river lay below me, with three people standing on it next to a car, all of them in front of a yellow cabin. The largest of them pointed something at me, but it was too far away to be concerned about. I wondered if they would leave me anything to eat.

I came back. The flickering went on, and for a moment I didn't know what was happening. I turned to see Leon squeeze the trigger. The rifle report hurt my ears and flapped away into oblivion. I smelled the burnt gunpowder, saw smoke issue from the barrel.

The hawk fell. Leon dropped the rifle. He staggered back and cried out, suddenly clasping his left arm with his right hand and falling to one knee. I heard him groan.

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"Dad!" Dan ran to his father.

I watched the man and his son. And I looked at the fallen hawk. It was not dead. I walked toward it as if in a dream, and I saw that its left leg had been hit, the bullet almost severing it. Only a few shreds of sinew held it together. The bullet had carried through the left wing, too. Most of the wing was gone, and the bare bone protruded from a confusion of brown feathers. There wasn't that much blood, but somehow that made it even more grotesque. The hawk fluttered its useless wing with a sad, riffling sound. It tried to escape, but it couldn't.

I went into the cabin and found the bullet still standing on the table, a brass spire that fit into the palm of my hand. I took it and went outside, and reloaded the Mauser. It was only a few paces to the hawk, who still struggled to get to his feet, to take flight, to go back into the forest where he would be safe.

I shot him. Right through the head. I looked at his blasted, still remnant, and then turned away. Dan and Leon were staring at me. Leon was sitting on the bottom step, pale and shaking. Dan was frightened, but trying to comfort his father.

"Are you all right, Mr. Blanchard?" I asked.

"Yes, thank you . . . I'm all right, Jim," Leon said. But I knew that he wasn't.

"What happened, Dad?" Dan said over and over again.

At last Leon answered him. "I don't know, son . . . I really don't know."

"Can you get into the car?" I asked.

"I . . . think so."

We helped him get up. His dark eyes were frightening. Dan was crying. I'd never seen him cry before, and I'd known him all my life.

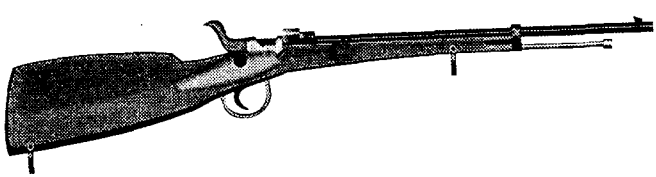
Leon couldn't drive. We got him into the back seat, and Dan drove us away from the river, slowly and carefully bumping down the road as snow fell around us.

Leon was never the same. At first the doctors thought he must have suffered a stroke, but they found no evidence of it. He died a few months later, a tiny, shriveled mummy of a man. Nobody ever understood what had happened to him

Do you want to know what I think?

I think something came to those woods all those years ago, on a cold November morning, something that could look into the minds of men and animals, and somehow *link them from a distance,* without benefit of axon or neuron. That something glided from one mind to another, as effortlessly as you or I might view pictures in a gallery. It might have been comparing animal minds to human, I don't know. I only know that I carry the memory of the fish and the hawk with me to this day. We were the same. Connected. And Leon was connected to that hawk, too, but at the wrong moment.

It could have been Dan. It could have been me. But it was Leon, God rest his shattered soul. O



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Personality Points on the Plane of Existence

Trapezoids I forgive.
They are, after all, quite
complex fellows, not really
sure what their area is.

But triangles are very edgy
you never know which side
they really are on.

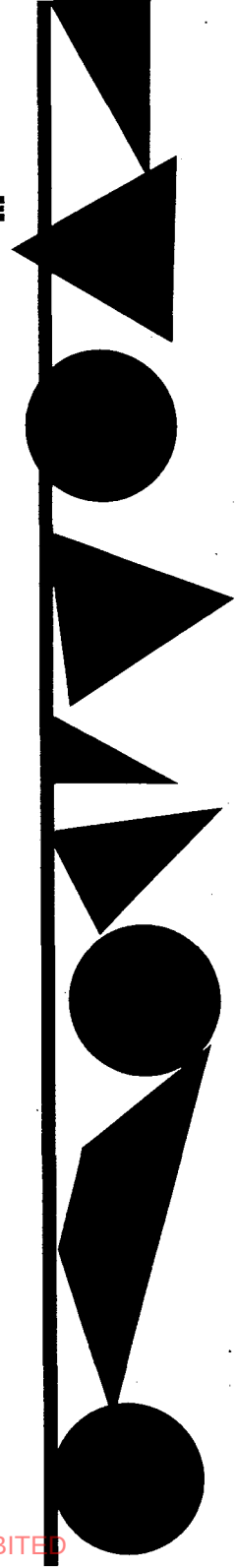
Circles just seem to go on
and on, and on, and on . . .

Be careful when sharing pi
with a pair of radii,
they won't look you
in the eye.

Diameter may go all the way
but even with the right angle
she'll never give you any arc.

Parallel lines are unsocial.
They walk with you
forever, but refuse
to meet you.

—John Nichols



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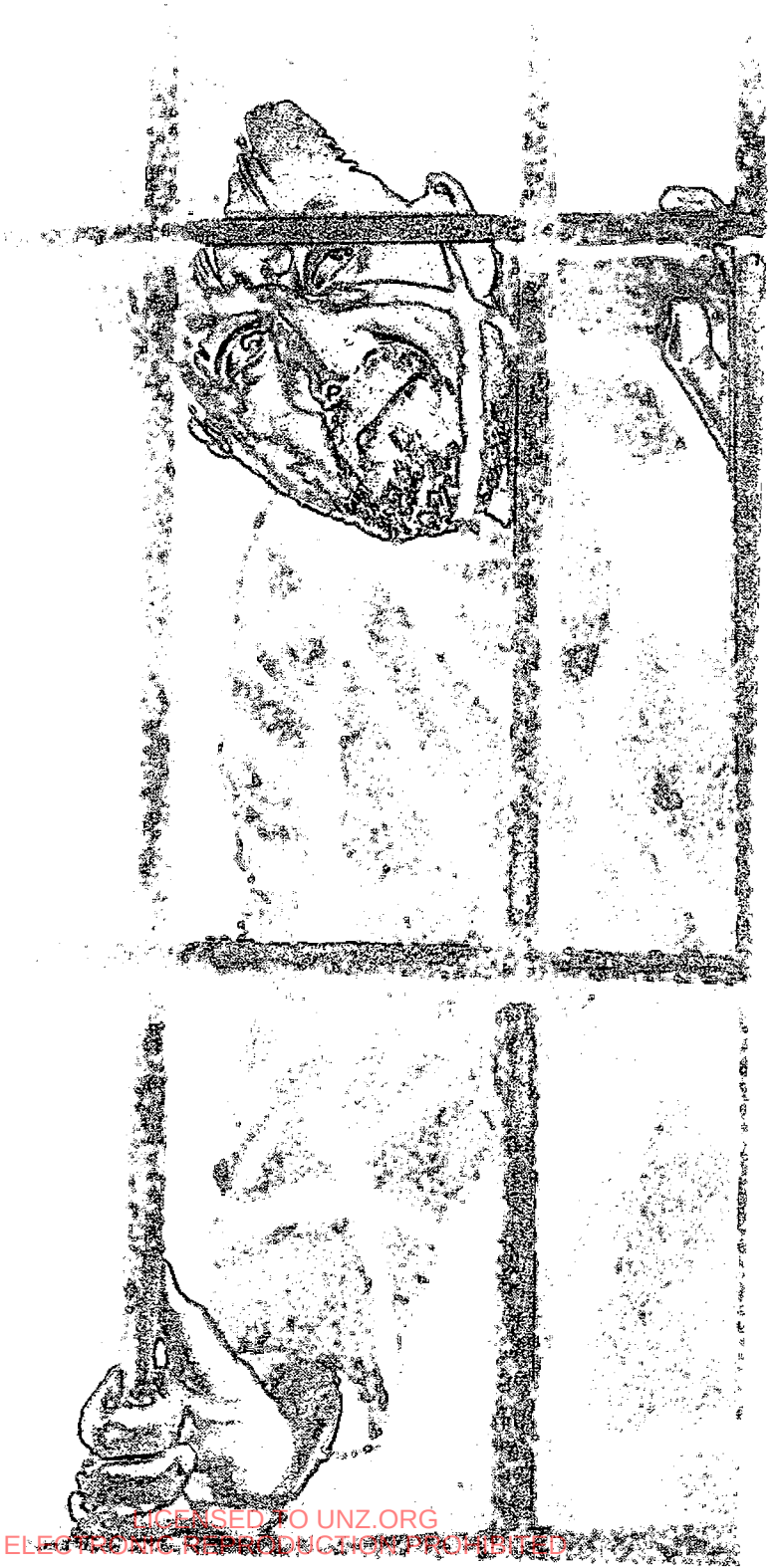

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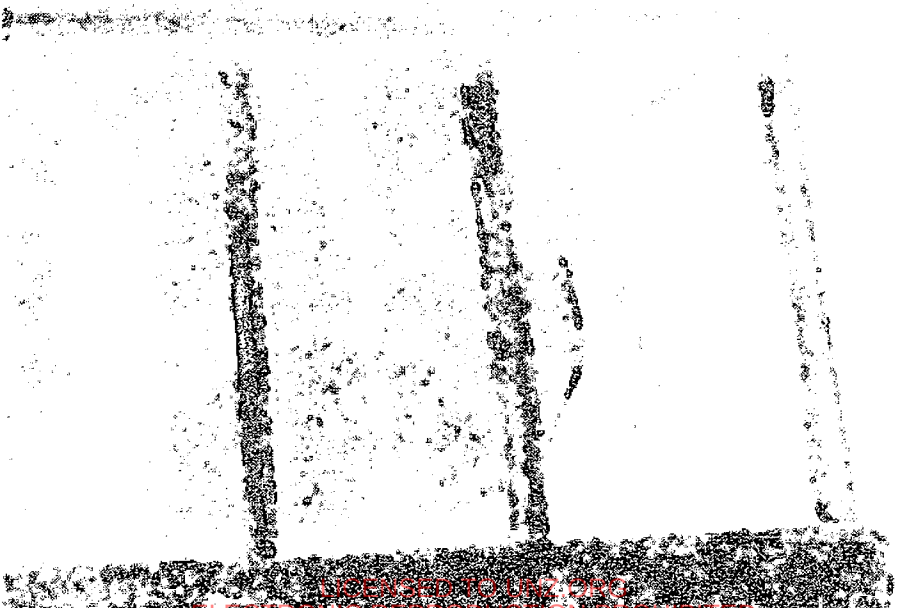
ORACLE

Greg Egan

Illustration by Steve Cavalie

Greg Egan's most recent novella for us, "Oceanic" (August 1998), won the *Asimov's* Readers' Award poll and the 1999 Hugo Award. The author's latest novels include *Diaspora* (HarperPrism, 1998) and *Teranesia* (HarperPrism, 1999). His next book will be a far-future SF novel, *Schild's Ladder*. Computer-generated illustrations for some of his work can be found on the internet at *http://www.netspace.net.au/~gregegan/*.



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1

On his eighteenth day in the tiger cage, Robert Stoney began to lose hope of emerging unscathed.

He'd woken a dozen times throughout the night with an overwhelming need to stretch his back and limbs, and none of the useful compromise positions he'd discovered in his first few days—the least-worst solutions to the geometrical problem of his confinement—had been able to dull his sense of panic. He'd been in far more pain in the second week, suffering cramps that felt as if the muscles of his legs were dying on the bone, but these new spasms had come from somewhere deeper, powered by a sense of urgency that revolved entirely around his own awareness of his situation.

That was what frightened him. Sometimes he could find ways to minimize his discomfort, sometimes he couldn't, but he'd been clinging to the thought that, in the end, all these fuckers could ever do was hurt him. That wasn't true, though. They could make him ache for freedom in the middle of the night, the way he might have ached with grief, or love. He'd always cherished the understanding that his self was a whole, his mind and body indivisible. But he'd failed to appreciate the corollary: through his body, they could touch every part of him. Change every part of him.

Morning brought a fresh torment: hay fever. The house was somewhere deep in the countryside, with nothing to be heard in the middle of the day but bird song. June had always been his worst month for hay fever, but in Manchester it had been tolerable. As he ate breakfast, mucus dripped from his face into the bowl of lukewarm oats they'd given him. He stanched the flow with the back of his hand, but suffered a moment of shuddering revulsion when he couldn't find a way to reposition himself to wipe his hand clean on his trousers. Soon he'd need to empty his bowels. They supplied him with a chamber pot whenever he asked, but they always waited two or three hours before removing it. The smell was bad enough, but the fact that it took up space in the cage was worse.

Toward the middle of the morning, Peter Quint came to see him. "How are we today, Prof?" Robert didn't reply. Since the day Quint had responded with a puzzled frown to the suggestion that he had an appropriate name for a spook, Robert had tried to make at least one fresh joke at the man's expense every time they met, a petty but satisfying indulgence. But now his mind was blank, and, in retrospect the whole exercise seemed like an insane distraction, as bizarre and futile as scoring philosophical points against some predatory animal while it gnawed on his leg.

"Many happy returns," Quint said cheerfully.

Robert took care to betray no surprise. He'd never lost track of the days, but he'd stopped thinking in terms of the calendar date; it simply wasn't relevant. Back in the real world, to have forgotten his own birthday would have been considered a benign eccentricity. Here it would be taken as proof of his deterioration, and imminent surrender.

If he was cracking, he could at least choose the point of fissure. He spoke as calmly as he could, without looking up. "You know I almost qualified for the Olympic marathon, back in forty-eight? If I hadn't done my hip in just before the trials, I might have competed." He tried a self-deprecating laugh. "I suppose I was never really much of an athlete. But I'm only forty-six. I'm not ready for a wheelchair yet." The words did help: he could beg this way

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without breaking down completely, expressing an honest fear without revealing how much deeper the threat of damage went.

He continued, with a measured note of plaintiveness that he hoped sounded like an appeal to fairness. "I just can't bear the thought of being crippled. All I'm asking is that you let me stand upright. Let me keep my health."

Quint was silent for a moment, then he replied with a tone of thoughtful sympathy. "It's unnatural, isn't it? Living like this: bent over, twisted, day after day. Living in an unnatural way is always going to harm you. I'm glad you can finally see that."

Robert was tired; it took several seconds for the meaning to sink in. *It was that crude, that obvious?* They'd locked him in this cage, for all this time . . . as a kind of ham-fisted *metaphor* for his crimes?

He almost burst out laughing, but he contained himself. "I don't suppose you know Franz Kafka?"

"Kafka?" Quint could never hide his voracity for names. "One of your Commie chums, is he?"

"I very much doubt that he was ever a Marxist."

Quint was disappointed, but prepared to make do with second best. "One of the other kind, then?"

Robert pretended to be pondering the question. "On balance, I suspect that's not too likely either."

"So why bring his name up?"

"I have a feeling he would have admired your methods, that's all. He was quite the connoisseur."

"Hmm." Quint sounded suspicious, but not entirely unflattered.

Robert had first set eyes on Quint in February of 1952. His house had been burgled the week before, and Arthur, a young man he'd been seeing since Christmas, had confessed to Robert that he'd given an acquaintance the address. Perhaps the two of them had planned to rob him, and Arthur had backed out at the last moment. In any case, Robert had gone to the police with an unlikely story about spotting the culprit in a pub, trying to sell an electric razor of the same make and model as the one taken from his house. No one could be charged on such flimsy evidence, so Robert had had no qualms about the consequences if Arthur had turned out to be lying. He'd simply hoped to prompt an investigation that might turn up something more tangible.

The following day, the CID had paid Robert a visit. The man he'd accused was known to the police, and fingerprints taken on the day of the burglary matched the prints they had on file. However, at the time Robert claimed to have seen him in the pub, he'd been in custody already on an entirely different charge.

The detectives had wanted to know why he'd lied. To spare himself the embarrassment, Robert had explained, of spelling out the true source of his information. Why was that embarrassing?

"I'm involved with the informant."

One detective, Mr. Wills, had asked matter-of-factly, "What exactly does that entail, sir?" And Robert—in a burst of frankness, as if honesty itself was sure to be rewarded—had told him every detail. He'd known it was still technically illegal, of course. But then, so was playing football on Easter Sunday. It could hardly be treated as a serious crime, like burglary.

The police had strung him along for hours, gathering as much information as they could before disabusing him of this misconception. They hadn't

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charged him immediately; they'd needed a statement from Arthur first. But then Quint had materialized the next morning, and spelt out the choices very starkly. Three years in prison, with hard labor. Or Robert could resume his war-time work—for just one day a week, as a handsomely paid consultant to Quint's branch of the secret service—and the charges would quietly vanish.

At first, he'd told Quint to let the courts do their worst. He'd been angry enough to want to take a stand against the preposterous law, and whatever his feelings for Arthur, Quint had suggested—gloatingly, as if it strengthened his case—that the younger, working-class man would be treated far more leniently than Robert, having been led astray by someone whose duty was to set an example for the lower orders. Three years in prison was an unsettling prospect, but it would not have been the end of the world; the Mark I had changed the way he worked, but he could still function with nothing but a pencil and paper, if necessary. Even if they'd had him breaking rocks from dawn to dusk, he probably would have been able to daydream productively, and for all Quint's scaremongering he'd doubted it would come to that.

At some point, though, in the twenty-four hours Quint had given him to reach a decision, he'd lost his nerve. By granting the spooks their one day a week, he could avoid all the fuss and disruption of a trial. And though his work at the time—modeling embryological development—had been as challenging as anything he'd done in his life, he hadn't been immune to pangs of nostalgia for the old days, when the fate of whole fleets of battleships had rested on finding the most efficient way to extract logical contradictions from a bank of rotating wheels.

The trouble with giving in to extortion was, *it proved that you could be bought.* Never mind that the Russians could hardly have offered to intervene with the Manchester constabulary next time he needed to be rescued. Never mind that he would scarcely have cared if an enemy agent had threatened to send such comprehensive evidence to the newspapers that there'd be no prospect of his patrons saving him again. He'd lost any chance to proclaim that what he did in bed with another willing partner was not an issue of national security; by saying yes to Quint, he'd made it one. By choosing to be corrupted once, he'd brought the whole torrent of clichés and paranoia down upon his head: he was vulnerable to blackmail, an easy target for entrapment, perfidious by nature. He might as well have posed *in flagrante delicto* with Guy Burgess on the steps of the Kremlin.

It wouldn't have mattered if Quint and his masters had merely decided that they couldn't trust him. The problem was—some six years after recruiting him, with no reason to believe that he had ever breached security in any way—they'd convinced themselves that they could neither continue to employ him, nor safely leave him in peace, until they'd rid him of the trait they'd used to control him in the first place.

Robert went through the painful, complicated process of rearranging his body so he could look Quint in the eye. "You know, if it was legal there'd be nothing to worry about, would there? Why don't you devote some of your considerable Machiavellian talents to that end? Blackmail a few politicians. Set up a Royal Commission. It would only take you a couple of years. Then we could all get on with our real jobs."

Quint blinked at him, more startled than outraged. "You might as well say that we should legalize treason!"

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Robert opened his mouth to reply, then decided not to waste his breath. Quint wasn't expressing a moral opinion. He simply meant that a world in which fewer people's lives were ruled by the constant fear of discovery was hardly one that a man in his profession would wish to hasten into existence.

When Robert was alone again, the time dragged. His hay fever worsened, until he was sneezing and gagging almost continuously; even with freedom of movement and an endless supply of the softest linen handkerchiefs, he would have been reduced to abject misery. Gradually, though, he grew more adept at dealing with the symptoms, delegating the task to some barely conscious part of himself. By the middle of the afternoon—covered in filth, eyes almost swollen shut—he finally managed to turn his mind back to his work.

For the past four years, he'd been immersed in particle physics. He'd been following the field on and off since before the war, but the paper by Yang and Mills in '54, in which they'd generalized Maxwell's equations for electromagnetism to apply to the strong nuclear force, had jolted him into action.

After several false starts, he believed he'd discovered a useful way to cast gravity into the same form. In general relativity, if you carried a four-dimensional velocity vector around a loop that enclosed a curved region of spacetime, it came back rotated—a phenomenon highly reminiscent of the way more abstract vectors behaved in nuclear physics. In both cases, the rotations could be treated algebraically, and the traditional way to get a handle on this was to make use of a set of matrices of complex numbers whose relationships mimicked the algebra in question. Hermann Weyl had catalogued most of the possibilities back in the twenties and thirties.

In spacetime, there were six distinct ways you could rotate an object: you could turn it around any of three perpendicular axes in space, or you could boost its velocity in any of the same three directions. These two kinds of rotation were complementary, or "dual" to each other, with the ordinary rotations only affecting coordinates that were untouched by the corresponding boost, and *vice versa*. This meant that you could rotate something around, say, the x-axis, and speed it up in the same direction, without the two processes interfering.

When Robert had tried applying the Yang-Mills approach to gravity in the obvious way, he'd floundered. It was only when he'd shifted the algebra of rotations into a new, strangely skewed guise that the mathematics had begun to fall into place. Inspired by a trick that particle physicists used to construct fields with left- or right-handed spin, he'd combined every rotation with its own dual multiplied by i, the square root of minus one. The result was a set of rotations in four *complex* dimensions, rather than the four real ones of ordinary spacetime, but the relationships between them preserved the original algebra.

Demanding that these "self-dual" rotations satisfy Einstein's equations turned out to be equivalent to ordinary general relativity, but the process leading to a quantum-mechanical version of the theory became dramatically simpler. Robert still had no idea how to interpret this, but as a purely formal trick it worked spectacularly well—and when the mathematics fell into place like that, it had to mean *something*.

He spent several hours pondering old results, turning them over in his mind's eye, rechecking and reimagining everything in the hope of forging some new connection. Making no progress, but there'd always been days

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like that. It was a triumph merely to spend this much time doing what he would have done back in the real world—however mundane, or even frustrating, the same activity might have been in its original setting.

By evening, though, the victory began to seem hollow. He hadn't lost his wits entirely, but he was frozen, stunted. He might as well have whiled away the hours reciting the base-32 multiplication table in Baudot code, just to prove that he still remembered it.

As the room filled with shadows, his powers of concentration deserted him completely. His hay fever had abated, but he was too tired to think, and in too much pain to sleep. This wasn't Russia, they couldn't hold him forever; he simply had to wear them down with his patience. *But when, exactly, would they have to let him go?* And how much more patient could *Quint* be, with no pain, no terror, to erode his determination?

The moon rose, casting a patch of light on the far wall; hunched over, he couldn't see it directly, but it silvered the gray at his feet, and changed his whole sense of the space around him. The cavernous room mocking his confinement reminded him of nights he'd spent lying awake in the dormitory at Sherborne. A public school education did have one great advantage: however miserable you were afterward, you could always take comfort in the knowledge that life would never be quite as bad again.

"This room smells of mathematics! Go out and fetch a disinfectant spray!" That had been his form-master's idea of showing what a civilized man he was: contempt for that loathsome subject, the stuff of engineering and other low trades. And as for Robert's chemistry experiments, like the beautiful color-changing iodate reaction he'd learned from Chris's brother —

Robert felt a familiar ache in the pit of his stomach. *Not now. I can't afford this now.* But the whole thing swept over him, unwanted, unbidden. He used to meet Chris in the library on Wednesdays; for months, that had been the only time they could spend together. Robert had been fifteen then, Chris a year older. If Chris had been plain, he still would have shone like a creature from another world. No one else in Sherborne had read Eddington on relativity, Hardy on mathematics. No one else's horizons stretched beyond rugby, sadism, and the dimly satisfying prospect of reading classics at Oxford, then vanishing into the maw of the civil service.

They had never touched, never kissed. While half the school had been indulging in passionless sodomy—as a rather literal-minded substitute for the much too difficult task of imagining women—Robert had been too shy even to declare his feelings. Too shy, and too afraid that they might not be reciprocated. It hadn't mattered. To have a friend like Chris had been enough.

In December of 1929, they'd both sat the exams for Trinity College, Cambridge. Chris had won a scholarship; Robert hadn't. He'd reconciled himself to their separation, and prepared for one more year at Sherborne without the one person who'd made it bearable. Chris would be following happily in the footsteps of Newton; just thinking of that would be some consolation.

Chris never made it to Cambridge. In February, after six days in agony, he'd died of bovine tuberculosis.

Robert wept silently, angry with himself because he knew that half his wretchedness was just self-pity, exploiting his grief as a disguise. He had to stay honest; once every source of unhappiness in his life melted together and became indistinguishable, he'd be like a cowed animal, with no sense of the past or the future. Ready to do anything to get out of the cage.

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If he hadn't yet reached that point, he was close. It would only take a few more nights like the last one. Drifting off in the hope of a few minutes' blankness, to find that sleep itself shone a colder light on everything. Drifting off, then waking with a sense of loss so extreme it was like suffocation.

A woman's voice spoke from the darkness in front of him. "Get off your knees!"

Robert wondered if he was hallucinating. He'd heard no one approach across the creaky floorboards.

The voice said nothing more. Robert rearranged his body so he could look up from the floor. There was a woman he'd never seen before, standing a few feet away.

She'd sounded angry, but as he studied her face in the moonlight through the slits of his swollen eyes, he realized that her anger was directed, not at him, but at his condition. She gazed at him with an expression of horror and outrage, as if she'd chanced upon him being held like this in some respectable neighbor's basement, rather than an MI6 facility. Maybe she was one of the staff employed in the upkeep of the house, but had no idea what went on here? Surely those people were vetted and supervised, though, and threatened with life imprisonment if they ever set foot outside their prescribed domains.

For one surreal moment, Robert wondered if Quint had sent her to seduce him. It would not have been the strangest thing they'd tried. But she radiated such fierce self-assurance—such a sense of confidence that she could speak with the authority of her convictions, and expect to be heeded—that he knew she could never have been chosen for the role. No one in Her Majesty's government would consider self-assurance an attractive quality in a woman.

He said, "Throw me the key, and I'll show you my Roger Bannister impression."

She shook her head. "You don't need a key. Those days are over."

Robert started with fright. *There were no bars between them.* But the cage couldn't have vanished before his eyes; she must have removed it while he'd been lost in his reverie. He'd gone through the whole painful exercise of turning to face her as if he were still confined, without even noticing.

Removed it how?

He wiped his eyes, shivering at the dizzying prospect of freedom. "Who are you?" An agent for the Russians, sent to liberate him from his own side? She'd have to be a zealot, then, or strangely naive, to view his torture with such wide-eyed innocence.

She stepped forward, then reached down and took his hand. "Do you think you can walk?" Her grip was firm, and her skin was cool and dry. She was completely unafraid; she might have been a good Samaritan in a public street helping an old man to his feet after a fall—not an intruder helping a threat to national security break out of therapeutic detention, at the risk of being shot on sight.

"I'm not even sure I can stand." Robert steeled himself; maybe this woman was a trained assassin, but it would be too much to presume that if he cried out in pain and brought guards rushing in, she could still extricate him without raising a sweat. "You haven't answered my question."

"My name's Helen." She smiled and hoisted him to his feet, looking at once like a compassionate child pulling open the jaws of a hunter's cruel

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trap, and a very powerful, very intelligent carnivore contemplating its own strength. "I've come to change everything."

Robert said, "Oh, good."

Robert found that he could hobble; it was painful and undignified, but at least he didn't have to be carried. Helen led him through the house; lights showed from some of the rooms, but there were no voices, no footsteps save their own, no signs of life at all. When they reached the tradesmen's entrance, she unbolted the door, revealing a moonlit garden.

"Did you kill everyone?" he whispered. He'd made far too much noise to have come this far unmolested. Much as he had reason to despise his captors, mass-murder on his behalf was a lot to take in.

Helen cringed. "What a revolting idea! It's hard to believe sometimes, how uncivilized you are."

"You mean the British?"

"All of you!"

"I must say, your accent's rather good."

"I watched a lot of cinema," she explained. "Mostly Ealing comedies. You never know how much that will help, though."

"Quite."

They crossed the garden, heading for a wooden gate in the hedge. Since murder was strictly for imperialists, Robert could only assume that she'd managed to drug everyone.

The gate was unlocked. Outside the grounds, a cobbled lane ran past the hedge, leading into forest. Robert was barefoot, but the stones weren't cold, and the slight unevenness of the path was welcome, restoring circulation to the soles of his feet.

As they walked, he took stock of his situation. He was out of captivity, thanks entirely to this woman. Sooner or later he was going to have to confront her agenda.

He said, "I'm not leaving the country."

Helen murmured assent, as if he'd passed a casual remark about the weather.

"And I'm not going to discuss my work with you."

"Fine."

Robert stopped and stared at her. She said, "Put your arm across my shoulders."

He complied; she was exactly the right height to support him comfortably. He said, "You're not a Soviet agent, are you?"

Helen was amused. "Is that really what you thought?"

"I'm not all that quick on my feet tonight."

"No." They began walking together. Helen said, "There's a train station about three kilometers away. You can get cleaned up, rest there until morning, and decide where you want to go."

"Won't the station be the first place they'll look?"

"They won't be looking anywhere for a while."

The moon was high above the trees. The two of them could not have made a more conspicuous couple: a sensibly dressed, quite striking young woman, supporting a filthy, ragged tramp. If a villager cycled past, the best they could hope for was being mistaken for an alcoholic father and his martyred daughter.

Martyred, all right: she moved so efficiently, despite the burden, that any

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onlooker would assume she'd been doing this for years. Robert tried altering his gait slightly, subtly changing the timing of his steps to see if he could make her falter, but Helen adapted instantly. If she knew she was being tested, though, she kept it to herself.

Finally he said, "What did you do with the cage?"

"I time-reversed it."

Hairs stood up on the back of his neck. Even assuming that she could do such a thing, it wasn't at all clear to him how that could have stopped the bars from scattering light and interacting with his body. It should merely have turned electrons into positrons, and killed them both in a shower of gamma rays.

That conjuring trick wasn't his most pressing concern, though. "I can only think of three places you might have come from," he said.

Helen nodded, as if she'd put herself in his shoes and catalogued the possibilities. "Rule out one; the other two are both right."

She was not from an extrasolar planet. Even if her civilization possessed some means of viewing Ealing comedies from a distance of light years, she was far too sensitive to his specific human concerns.

She was from the future, but not his own.

She was from the future of another Everett branch.

He turned to her. "No paradoxes."

She smiled, deciphering his shorthand immediately. "That's right. It's physically impossible to travel into your own past, unless you've made exacting preparations to ensure compatible boundary conditions. That *can* be achieved, in a controlled laboratory setting—but in the field it would be like trying to balance ten thousand elephants in an inverted pyramid, while the bottom one rode a unicycle: excruciatingly difficult, and entirely pointless."

Robert was tongue-tied for several seconds, a horde of questions battling for access to his vocal chords. "But how do you travel into the past at all?"

"It will take a while to bring you up to speed completely, but if you want the short answer: you've already stumbled on one of the clues. I read your paper in *Physical Review,* and it's correct as far as it goes. Quantum gravity involves four complex dimensions, but the only classical solutions—the only geometries that remain in phase under slight perturbations—have curvature that's either *self-dual,* or *anti-self-dual.* Those are the only stationary points of the action, for the complete Lagrangian. And both solutions appear, from the inside, to contain only four real dimensions.

"It's meaningless to ask which sector we're in, but we might as well call it self-dual. In that case, the anti-self-dual solutions have an arrow of time running backward compared to ours."

"Why?" As he blurted out the question, Robert wondered if he sounded like an impatient child to her. But if she suddenly vanished back into thin air, he'd have far fewer regrets for making a fool of himself this way than if he'd maintained a façade of sophisticated nonchalance.

Helen said, "Ultimately, that's related to spin. And it's down to the mass of the neutrino that we can tunnel between sectors. But I'll need to draw you some diagrams and equations to explain it all properly."

Robert didn't press her for more; he had no choice but to trust that she wouldn't desert him. He staggered on in silence, a wonderful ache of anticipation building in his chest. If someone had put this situation to him hypothetically, he would have piously insisted that he'd prefer to toil on at his own pace. But despite the satisfaction it had given him on the few occasions

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when he'd made genuine discoveries himself, what mattered in the end was understanding as much as you could, *however* you could. Better to ransack the past and the future than go through life in a state of willful ignorance.

"You said you've come to change things?"

She nodded. "I can't predict the future here, of course, but there are pitfalls in my own past that I can help you avoid. In my twentieth century, people discovered things too slowly. Everything changed much too slowly. Between us, I think we can speed things up."

Robert was silent for a while, contemplating the magnitude of what she was proposing. Then he said, "It's a pity you didn't come sooner. In this branch, about twenty years ago—"

Helen cut him off. "I know. We had the same war. The same Holocaust, the same Soviet death toll. But we've yet to be able to avert that, anywhere. You can never do anything in just one history—even the most focused intervention happens across a broad 'ribbon' of strands. When we try to reach back to the thirties and forties, the ribbon overlaps with its own past to such a degree that all the worst horrors are *faits accompli*. We can't shoot *any* version of Adolf Hitler, because we can't shrink the ribbon to the point where none of us would be shooting ourselves in the back. All we've ever managed are minor interventions, like sending projectiles back to the Blitz, saving a few lives by deflecting bombs."

"What, knocking them into the Thames?"

"No, that would have been too risky. We did some modeling, and the safest thing turned out to be diverting them onto big, empty buildings: Westminster Abbey, Saint Paul's Cathedral."

The station came into view ahead of them. Helen said, "What do you think? Do you want to head back to Manchester?"

Robert hadn't given the question much thought. Quint could track him down anywhere, but the more people he had around him, the less vulnerable he'd be. In his house in Wilmslow he'd be there for the taking.

"I still have rooms at Cambridge," he said tentatively.

"Good idea."

"What are your own plans?"

Helen turned to him. "I thought I'd stay with you." She smiled at the expression on his face. "Don't worry, I'll give you plenty of privacy. And if people want to make assumptions, let them. You already have a scandalous reputation; you might as well see it branch out in new directions."

Robert said wryly, "I'm afraid it doesn't quite work that way. They'd throw us out immediately."

Helen snorted. "They could try."

"You may have defeated MI6, but you haven't dealt with Cambridge porters." The reality of the situation washed over him anew at the thought of her in his study, writing out the equations for time travel on the blackboard. "*Why me?* I can appreciate that you'd want to make contact with someone who could understand how you came here—but why not Everett, or Yang, or Feynman? Compared to Feynman, I'm a dilettante."

Helen said, "Maybe. But you have an equally practical bent, and you'll learn fast enough."

There had to be more to it than that: thousands of people would have been capable of absorbing her lessons just as rapidly. "The physics you've hinted at—in your past, did I discover all that?"

"No. Your *Physical Review* paper helped me track you down here, but in

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my own history that was never published." There was a flicker of disquiet in her eyes, as if she had far greater disappointments in store on that subject.

Robert didn't care much either way; if anything, the less his alter ego had achieved, the less he'd be troubled by jealousy.

"Then what was it, that made you choose me?"

"You really haven't guessed?" Helen took his free hand and held the fingers to her face; it was a tender gesture, but much more like a daughter's than a lover's. "It's a warm night. No one's skin should be this cold."

Robert gazed into her dark eyes, as playful as any human's, as serious, as proud. Given the chance, perhaps any decent person would have plucked him from Quint's grasp. But only one kind would feel a special obligation, as if they were repaying an ancient debt.

He said, "You're a machine."

2

John Hamilton, Professor of Medieval and Renaissance English at Magdalene College, Cambridge, read the last letter in the morning's pile of fan mail with a growing sense of satisfaction.

The letter was from a young American, a twelve-year-old girl in Boston. It opened in the usual way, declaring how much pleasure his books had given her, before going on to list her favorite scenes and characters. As ever, Jack was delighted that the stories had touched someone deeply enough to prompt them to respond this way. But it was the final paragraph that was by far the most gratifying:

> However much other children might tease me, or grown-ups too when I'm older, I will NEVER, EVER stop believing in the Kingdom of Nescia. Sarah stopped believing, and she was locked out of the Kingdom forever. At first that made me cry, and I couldn't sleep all night because I was afraid I might stop believing myself one day. But I understand now that it's good to be afraid, because it will help me keep people from changing my mind. And if you're not willing to believe in magic lands, of course you can't enter them. There's nothing even Belvedere himself can do to save you, then.

Jack refilled and lit his pipe, then reread the letter. This was his vindication: the proof that through his books he could touch a young mind, and plant the seed of faith in fertile ground. It made all the scorn of his jealous, stuck-up colleagues fade into insignificance. Children understood the power of stories, the reality of myth, the need to believe in something beyond the dismal gray farce of the material world.

It wasn't a truth that could be revealed the "adult" way: through scholarship, or reason. Least of all through philosophy, as Elizabeth Anscombe had shown him on that awful night at the Socratic Club. A devout Christian herself, Anscombe had nonetheless taken all the arguments against materialism from his popular book, *Signs and Wonders*, and trampled them into the ground. It had been an unfair match from the start: Anscombe was a professional philosopher, steeped in the work of everyone from Aquinas to Wittgenstein; Jack knew the history of ideas in medieval Europe intimate-

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ly, but he'd lost interest in modern philosophy once it had been invaded by fashionable positivists. And *Signs and Wonders* had never been intended as a scholarly work; it had been good enough to pass muster with a sympathetic lay readership, but trying to defend his admittedly rough-and-ready mixture of common sense and useful shortcuts to faith against Anscombe's merciless analysis had made him feel like a country yokel stammering in front of a bishop.

Ten years later, he still burned with resentment at the humiliation she'd put him through, but he was grateful for the lesson she'd taught him. His earlier books, and his radio talks, had not been a complete waste of time—but the harpy's triumph had shown him just how pitiful human reason was when it came to the great questions. He'd begun working on the stories of Nescia years before, but it was only when the dust had settled on his most painful defeat that he'd finally recognized his true calling.

He removed his pipe, stood, and turned to face Oxford. "Kiss my arse, Elizabeth!" he growled happily, waving the letter at her. This was a wonderful omen. It was going to be a very good day.

There was a knock at the door of his study.

"Come."

It was his brother, William. Jack was puzzled—he hadn't even realized Willie was in town—but he nodded a greeting and motioned at the couch opposite his desk.

Willie sat, his face flushed from the stairs, frowning. After a moment he said, "This chap Stoney."

"Hmm?" Jack was only half listening as he sorted papers on his desk. He knew from long experience that Willie would take forever to get to the point.

"Did some kind of hush-hush work during the war, apparently."

"Who did?"

"Robert Stoney. Mathematician. Used to be up at Manchester, but he's a Fellow of Kings, and now he's back in Cambridge. Did some kind of secret war work. Same thing as Malcolm Muggeridge, apparently. No one's allowed to say what."

Jack looked up, amused. He'd heard rumors about Muggeridge, but they all revolved around the business of analyzing intercepted German radio messages. What conceivable use would a mathematician have been, for that? Sharpening pencils for the intelligence analysts, presumably.

"What about him, Willie?" Jack asked patiently.

Willie continued reluctantly, as if he was confessing to something mildly immoral. "I paid him a visit yesterday. Place called the Cavendish. Old army friend of mine has a brother who works there. Got the whole tour."

"I know the Cavendish. What's there to see?"

"He's doing things, Jack. *Impossible things.*"

"Impossible?"

"Looking inside people. Putting it on a screen, like a television."

Jack sighed. "Taking X-rays?"

Willie snapped back angrily, "I'm not a fool; I know what an X-ray looks like. This is different. You can see the blood flow. You can watch your heart beating. You can follow a sensation through the nerves from . . . fingertip to brain. He says, soon he'll be able to watch a thought in motion."

"Nonsense." Jack scowled. "So he's invented some gadget, some fancy kind of X-ray machine. What are you so agitated about?"

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Willie shook his head gravely. "There's more. That's just the tip of the iceberg. He's only been back in Cambridge a year, and already the place is overflowing with . . . wonders." He used the word begrudgingly, as if he had no choice, but was afraid of conveying more approval than he intended.

Jack was beginning to feel a distinct sense of unease.

"What exactly is it you want me to do?" he asked.

Willie replied plainly, "Go and see for yourself. Go and see what he's up to."

The Cavendish Laboratory was a mid-Victorian building, designed to resemble something considerably older and grander. It housed the entire Department of Physics, complete with lecture theaters; the place was swarming with noisy undergraduates. Jack had had no trouble arranging a tour: he'd simply telephoned Stoney and expressed his curiosity, and no more substantial reason had been required.

Stoney had been allocated three adjoining rooms at the back of the building, and the "spin resonance imager" occupied most of the first. Jack obligingly placed his arm between the coils, then almost jerked it out in fright when the strange, transected view of his muscles and veins appeared on the picture tube. He wondered if it could be some kind of hoax, but he clenched his fist slowly and watched the image do the same, then made several unpredictable movements that it mimicked equally well.

"I can show you individual blood cells, if you like," Stoney offered cheerfully.

Jack shook his head; his current, unmagnified flaying was quite enough to take in.

Stoney hesitated, then added awkwardly, "You might want to talk to your doctor at some point. It's just that, your bone density's rather—" He pointed to a chart on the screen beside the image. "Well, it's quite a bit below the normal range."

Jack withdrew his arm. He'd already been diagnosed with osteoporosis, and he'd welcomed the news: it meant that he'd taken a small part of Joyce's illness—the weakness in her bones—into his own body. God was allowing him to suffer a little in her stead.

If Joyce were to step between these coils, what might that reveal? But there'd be nothing to add to her diagnosis. Besides, if he kept up his prayers, and kept up both their spirits, in time her remission would blossom from an uncertain reprieve into a fully fledged cure.

He said, "How does this work?"

"In a strong magnetic field, some of the atomic nuclei and electrons in your body are free to align themselves in various ways with the field." Stoney must have seen Jack's eyes beginning to glaze over; he quickly changed tack. "Think of it as being like setting a whole lot of spinning tops whirling, as vigorously as possible, then listening carefully as they slow down and tip over. For the atoms in your body, that's enough to give some clues as to what kind of molecule, and what kind of tissue, they're in. The machine listens to atoms in different places by changing the way it combines all the signals from billions of tiny antennae. It's like a whispering gallery where we can play with the time that signals take to travel from different places, moving the focus back and forth through any part of your body, thousands of times a second."

Jack pondered this explanation. Though it sounded complicated, in principle it wasn't that much stranger than X-rays.

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"The physics itself is old hat," Stoney continued, "but for imaging, you need a very strong magnetic field, and you need to make sense of all the data you've gathered. Nevill Mott made the superconducting alloys for the magnets. And I managed to persuade Rosalind Franklin from Birkbeck to collaborate with us, to help perfect the fabrication process for the computing circuits. We cross-link lots of little Y-shaped DNA fragments, then selectively coat them with metal; Rosalind worked out a way to use X-ray crystallography for quality control. We paid her back with a purpose-built computer that will let her solve hydrated protein structures in real time, once she gets her hands on a bright enough X-ray source." He held up a small, unprepossessing object, rimmed with protruding gold wires. "Each logic gate is roughly a hundred Ångstroms cubed, and we grow them in three-dimensional arrays. That's a million, million, million switches in the palm of my hand."

Jack didn't know how to respond to this claim. Even when he couldn't quite follow the man there was something mesmerizing about his ramblings, like a cross between William Blake and nursery talk.

"If computers don't excite you, we're doing all kinds of other things with DNA." Stoney ushered him into the next room, which was full of glassware, and seedlings in pots beneath strip lights. Two assistants seated at a bench were toiling over microscopes; another was dispensing fluids into test tubes with a device that looked like an overgrown eye-dropper.

"There are a dozen new species of rice, corn, and wheat here. They all have at least double the protein and mineral content of existing crops, and each one uses a different biochemical repertoire to protect itself against insects and fungi. Farmers have to get away from monocultures; it leaves them too vulnerable to disease, and too dependent on chemical pesticides."

Jack said, "You've bred these? All these new varieties, in a matter of months?"

"No, no! Instead of hunting down the heritable traits we needed in the wild, and struggling for years to produce cross-breeds bearing all of them, we designed every trait from scratch. Then we manufactured DNA that would make the tools the plants need, and inserted it into their germ cells."

Jack demanded angrily, "Who are you to say what a plant needs?"

Stoney shook his head innocently. "I took my advice from agricultural scientists, who took their advice from farmers. They know what pests and blights they're up against. Food crops are as artificial as Pekinese. Nature didn't hand them to us on a plate, and if they're not working as well as we need them to, nature isn't going to fix them for us."

Jack glowered at him, but said nothing. He was beginning to understand why Willie had sent him here. The man came across as an enthusiastic tinkerer, but there was a breath-taking arrogance lurking behind the boyish exterior.

Stoney explained a collaboration he'd brokered between scientists in Cairo, Bogotá, London, and Calcutta, to develop vaccines for polio, smallpox, malaria, typhoid, yellow fever, tuberculosis, influenza, and leprosy. Some were the first of their kind; others were intended as replacements for existing vaccines. "It's important that we create antigens without culturing the pathogens in animal cells that might themselves harbor viruses. The teams are all looking at variants on a simple, cheap technique that involves putting antigen genes into harmless bacteria that will double as delivery vehicles and adjuvants, then freeze-drying them into spores that can survive tropical heat without refrigeration."

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Jack was slightly mollified; this all sounded highly admirable. What business Stoney had instructing doctors on vaccines was another question. Presumably his jargon made sense to them, but when exactly had this mathematician acquired the training to make even the most modest suggestions on the topic?

"You're having a remarkably productive year," he observed.

Stoney smiled. "The muse comes and goes for all of us. But I'm really just the catalyst in most of this. I've been lucky enough to find some people—here in Cambridge, and further afield—who've been willing to chance their arm on some wild ideas. They've done the real work." He gestured toward the next room. "My own pet projects are through here."

The third room was full of electronic gadgets, wired up to picture tubes displaying both phosphorescent words and images resembling engineering blueprints come to life. In the middle of one bench, incongruously, sat a large cage containing several hamsters.

Stoney fiddled with one of the gadgets, and a face like a stylized drawing of a mask appeared on an adjacent screen. The mask looked around the room, then said, "Good morning, Robert. Good morning, Professor Hamilton."

Jack said, "You had someone record those words?"

The mask replied, "No, Robert showed me photographs of all the teaching staff at Cambridge. If I see anyone I know from the photographs, I greet them." The face was crudely rendered, but the hollow eyes seemed to meet Jack's. Stoney explained, "It has no idea what it's saying, of course. It's just an exercise in face and voice recognition."

Jack responded stiffly, "Of course."

Stoney motioned to Jack to approach and examine the hamster cage. He obliged him. There were two adult animals, presumably a breeding pair. Two pink young were suckling from the mother, who reclined in a bed of straw.

"Look closely," Stoney urged him. Jack peered into the nest, then cried out an obscenity and backed away.

One of the young was exactly what it seemed. The other was a machine, wrapped in ersatz skin, with a nozzle clamped to the warm teat.

"That's the most monstrous thing I've ever seen!" Jack's whole body was trembling. "What possible reason could you have to do that?"

Stoney laughed and made a reassuring gesture, as if his guest were a nervous child recoiling from a harmless toy. "It's not hurting her! And the point is to discover what it takes for the mother to accept it. To 'reproduce one's kind' means having some set of parameters as to what that *is*. Scent, and some aspects of appearance, are important cues in this case, but through trial and error I've also pinned down a set of behaviors that lets the simulacrum pass through every stage of the life cycle. An acceptable child, an acceptable sibling, an acceptable mate."

Jack stared at him, nauseated. "These animals fuck your machines?"

Stoney was apologetic. "Yes, but hamsters will fuck anything. I'll really have to shift to a more discerning species, in order to test that properly."

Jack struggled to regain his composure. "What on Earth possessed you, to do this?"

"In the long run," Stoney said mildly, "I believe this is something we're going to need to understand far better than we do at present. Now that we can map the structures of the brain in fine detail, and match its raw com-

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plexity with our computers, it's only a matter of a decade or so before we build machines that think.

"That in itself will be a vast endeavor, but I want to ensure that it's not stillborn from the start. There's not much point creating the most marvelous children in history, only to find that some awful mammalian instinct drives us to strangle them at birth."

Jack sat in his study drinking whisky. He'd telephoned Joyce after dinner, and they'd chatted for a while, but it wasn't the same as being with her. The weekends never came soon enough, and by Tuesday or Wednesday any sense of reassurance he'd gained from seeing her had slipped away entirely.

It was almost midnight now. After speaking to Joyce, he'd spent three more hours on the telephone, finding out what he could about Stoney. Milking his connections, such as they were; Jack had only been at Cambridge for five years, so he was still very much an outsider. Not that he'd ever been admitted into any inner circles back at Oxford: he'd always belonged to a small, quiet group of dissenters against the tide of fashion. Whatever else might be said about the Tiddlywinks, they'd never had their hands on the levers of academic power.

A year ago, while on sabbatical in Germany, Stoney had resigned suddenly from a position he'd held at Manchester for a decade. He'd returned to Cambridge, despite having no official posting to take up. He'd started collaborating informally with various people at the Cavendish, until the head of the place, Mott, had invented a job description for him, and given him a modest salary, the three rooms Jack had seen, and some students to assist him.

Stoney's colleagues were uniformly amazed by his spate of successful inventions. Though none of his gadgets were based on entirely new science, his skill at seeing straight to the heart of existing theories and plucking some practical consequence from them was unprecedented. Jack had expected some jealous back-stabbing, but no one seemed to have a bad word to say about Stoney. He was willing to turn his scientific Midas touch to the service of anyone who approached him, and it sounded to Jack as if every would-be skeptic or enemy had been bought off with some rewarding insight into their own field.

Stoney's personal life was rather murkier. Half of Jack's informants were convinced that the man was a confirmed pansy, but others spoke of a beautiful, mysterious woman named Helen, with whom he was plainly on intimate terms.

Jack emptied his glass and stared out across the courtyard. *Was it pride, to wonder if he might have received some kind of prophetic vision?* Fifteen years earlier, when he'd written *The Broken Planet,* he'd imagined that he'd merely been satirizing the hubris of modern science. His portrait of the evil forces behind the sardonically named Laboratory Overseeing Various Experiments had been intended as a deadly serious metaphor, but he'd never expected to find himself wondering if real fallen angels were whispering secrets in the ears of a Cambridge don.

How many times, though, had he told his readers that the devil's greatest victory had been convincing the world that he did not exist? The devil was *not* a metaphor, a mere symbol of human weakness: he was a real, scheming presence, acting in time, acting in the world, as much as God Himself.

And hadn't Faustus's damnation been sealed by the most beautiful woman of all time: Helen of Troy?

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Jack's skin crawled. He'd once written a humorous newspaper column called "Letters from a Demon," in which a Senior Tempter offered advice to a less experienced colleague on the best means to lead the faithful astray. Even that had been an exhausting, almost corrupting experience; adopting the necessary point of view, however whimsically, had made him feel that he was withering inside. The thought that a cross between the *Faustbuch* and *The Broken Planet* might be coming to life around him was too terrifying to contemplate. He was no hero out of his own fiction—not even a mild-mannered Cedric Duffy, let alone a modern Pendragon. And he did not believe that Merlin would rise from the woods to bring chaos to that hubristic Tower of Babel, the Cavendish Laboratory.

Nevertheless, if he was the only person in England who suspected Stoney's true source of inspiration, who *else* would act?

Jack poured himself another glass. There was nothing to be gained by procrastinating. He would not be able to rest until he knew what he was facing: a vain, foolish overgrown boy who was having a run of good luck—or a vain, foolish overgrown boy who had sold his soul and imperiled all humanity.

"A *Satanist?* You're accusing me of being a Satanist?"

Stoney tugged angrily at his dressing gown; he'd been in bed when Jack had pounded on the door. Given the hour, it had been remarkably civil of him to accept a visitor at all, and he appeared so genuinely affronted now that Jack was almost prepared to apologize and slink away. He said, "I had to ask you—"

"You have to be doubly foolish to be a Satanist," Stoney muttered.

"Doubly?"

"Not only do you need to believe all the nonsense of Christian theology, you then have to turn around and back the preordained, guaranteed-to-fail, absolutely futile *losing side.*" He held up his hand, as if he believed he'd anticipated the only possible objection to this remark, and wished to spare Jack the trouble of wasting his breath by uttering it. "I *know,* some people claim it's all really about some pre-Christian deity: Mercury, or Pan—guff like that. But assuming that we're not talking about some complicated mislabeling of objects of worship, I really can't think of anything more insulting. You're comparing me to someone like . . . *Huysmans,* who was basically just a very dim Catholic."

Stoney folded his arms and settled back on the couch, waiting for Jack's response.

Jack's head was thick from the whisky; he wasn't at all sure how to take this. It was the kind of smart-arsed undergraduate drivel he might have expected from any smug atheist—but then, short of a confession, exactly what kind of reply would have constituted evidence of guilt? *If you'd sold your soul to the devil, what lie would you tell in place of the truth?* Had he seriously believed that Stoney would claim to be a devout churchgoer, as if that were the best possible answer to put Jack off the scent?

He had to concentrate on things he'd seen with his own eyes, facts that could not be denied.

"You're plotting to overthrow nature, bending the world to the will of man."

Stoney sighed. "Not at all. More refined technology will help us tread more *lightly.* We have to cut back on pollution and pesticides as rapidly as

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possible. Or do you want to live in a world where all the animals are born as hermaphrodites, and half the Pacific islands disappear in storms?"

"Don't try telling me that you're some kind of guardian of the animal kingdom! You want to replace us all with machines!"

"Does every Zulu or Tibetan who gives birth to a child, and wants the best for it, threaten you in the same way?"

Jack bristled. "I'm not a racist. A Zulu or Tibetan has a *soul*."

Stoney groaned and put his head in his hands. "It's half past one in the morning! Can't we have this debate some other time?"

Someone banged on the door. Stoney looked up, disbelieving. "What is this? Grand Central Station?"

He crossed to the door and opened it. A disheveled, unshaven man pushed his way into the room. "Quint? What a pleasant—"

The intruder grabbed Stoney and slammed him against the wall. Jack exhaled with surprise. Quint turned bloodshot eyes on him.

"Who the fuck are you?"

"John Hamilton. Who the fuck are you?"

"Never you mind. Just stay put." He jerked Stoney's arm up behind his back with one hand, while grinding his face into the wall with the other. "You're mine now, you piece of shit. No one's going to protect you this time."

Stoney addressed Jack through a mouth squashed against the masonry. "Dith ith Pether Quinth, my own perthonal thpook. I did make a Fauthtian bargain. But with thtrictly temporal—"

"Shut up!" Quint pulled a gun from his jacket and held it to Stoney's head.

Jack said, "Steady on."

"Just how far do your connections go?" Quint screamed. "I've had memos disappear, sources clam up—and now my superiors are treating *me* like some kind of traitor! Well, don't worry: when I'm through with you, I'll have the names of the entire network." He turned to address Jack again. "And don't *you* think you're going anywhere."

Stoney said, "Leave him out of dith. He'th at Magdalene. You mutht know by now: all the thpieth are at Trinity."

Jack was shaken by the sight of Quint waving his gun around, but the implications of this drama came as something of a relief. Stoney's ideas must have had their genesis in some secret war-time research project. He hadn't made a deal with the devil after all, but he'd broken the Official Secrets Act, and now he was paying the price.

Stoney flexed his body and knocked Quint backward. Quint staggered, but didn't fall; he raised his arm menacingly, but there was no gun in his hand. Jack looked around to see where it had fallen, but he couldn't spot it anywhere. Stoney landed a kick squarely in Quint's testicles; barefoot, but Quint wailed with pain. A second kick sent him sprawling.

Stoney called out, "Luke? *Luke!* Would you come and give me a hand?"

A solidly built man with tattooed forearms emerged from Stoney's bedroom, yawning and tugging his braces into place. At the sight of Quint, he groaned. "Not again!"

Stoney said, "I'm sorry."

Luke shrugged stoically. The two of them managed to grab hold of Quint, then they dragged him struggling out the door. Jack waited a few seconds, then searched the floor for the gun. But it wasn't anywhere in sight, and it

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hadn't slid under the furniture; none of the crevices where it might have ended up were so dark that it would have been lost in shadow. It was not in the room at all.

Jack went to the window and watched the three men cross the courtyard, half expecting to witness an assassination. But Stoney and his lover merely lifted Quint into the air between them, and tossed him into a shallow, rather slimy-looking pond.

Jack spent the ensuing days in a state of turmoil. He wasn't ready to confide in anyone until he could frame his suspicions clearly, and the events in Stoney's rooms were difficult to interpret unambiguously. He couldn't state with absolute certainty that Quint's gun had vanished before his eyes. But surely the fact that Stoney was walking free proved that he was receiving supernatural protection? And Quint himself, confused and demoralized, had certainly had the appearance of a man who'd been demonically confounded at every turn.

If this was true, though, Stoney must have bought more with his soul than immunity from worldly authority. *The knowledge itself* had to be Satanic in origin, as the legend of Faustus described it. Tollers had been right, in his great essay "Mythopoesis": myths were remnants of man's pre-lapsarian capacity to apprehend, directly, the great truths of the world. Why else would they resonate in the imagination, and survive from generation to generation?

By Friday, a sense of urgency gripped him. He couldn't take his confusion back to Potter's Barn, back to Joyce and the boys. This had to be resolved, if only in his own mind, before he returned to his family.

With Wagner on the gramophone, he sat and meditated on the challenge he was facing. Stoney had to be thwarted, but how? Jack had always said that the Church of England—apparently so quaint and harmless, a Church of cake stalls and kindly spinsters—was like a fearsome army in the eyes of Satan. But even if his master were quaking in Hell, it would take more than a few stern words from a bicycling vicar to force Stoney to abandon his obscene plans.

But Stoney's intentions, in themselves, didn't matter. He'd been granted the power to dazzle and seduce, but not to force his will upon the populace. What mattered was how his plans were viewed by others. And the way to stop him was to open people's eyes to the true emptiness of his apparent cornucopia.

The more he thought and prayed about it, the more certain Jack became that he'd discerned the task required of him. No denunciation from the pulpits would suffice; people wouldn't turn down the fruits of Stoney's damnation on the mere say-so of the Church. Why would anyone reject such lustrous gifts, without a carefully reasoned argument?

Jack had been humiliated once, defeated once, trying to expose the barrenness of materialism. But might that not have been a form of preparation? He'd been badly mauled by Anscombe, but she'd made an infinitely gentler enemy than the one he now confronted. He had suffered from her taunts—but what was *suffering,* if not the chisel God used to shape his children into their true selves?

His role was clear, now. He would find Stoney's intellectual Achilles heel, and expose it to the world.

He would debate him.

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3

Robert gazed at the blackboard for a full minute, then started laughing with delight. "That's so beautiful!"

"Isn't it?" Helen put down the chalk and joined him on the couch. "Any more symmetry, and nothing would happen: the universe would be full of crystalline blankness. Any less, and it would all be uncorrelated noise."

Over the months, in a series of tutorials, Helen had led him through a small part of the century of physics that had separated them at their first meeting, down to the purely algebraic structures that lay beneath space-time and matter. Mathematics catalogued everything that was not self-contradictory; within that vast inventory, physics was an island of structures rich enough to contain their own beholders.

Robert sat and mentally reviewed everything he'd learned, trying to apprehend as much as he could in a single image. As he did, a part of him waited fearfully for a sense of disappointment, a sense of anticlimax. *He might never see more deeply into the nature of the world. In this direction, at least, there was nothing more to be discovered.*

But anticlimax was impossible. To become jaded with *this* was impossible. However familiar he became with the algebra of the universe, it would never grow less marvelous.

Finally he asked, "Are there other islands?" Not merely other histories, sharing the same underlying basis, but other realities entirely.

"I suspect so," Helen replied. "People have mapped some possibilities. I don't know how that could ever be confirmed, though."

Robert shook his head, sated. "I won't even think about that. I need to come down to Earth for a while." He stretched his arms and leaned back, still grinning.

Helen said, "Where's Luke today? He usually shows up by now, to drag you out into the sunshine."

The question wiped the smile from Robert's face. "Apparently I make poor company. Being insufficiently fanatical about darts and football."

"He's left you?" Helen reached over and squeezed his hand sympathetically. A little mockingly, too.

Robert was annoyed; she never said anything, but he always felt that she was judging him. "You think I should grow up, don't you? Find someone more like myself. Some kind of *soulmate*." He'd meant the word to sound sardonic, but it emerged rather differently.

"It's your life," she said.

A year before, that would have been a laughable claim, but it was almost the truth now. There was a *de facto* moratorium on prosecutions, while the recently acquired genetic and neurological evidence was being assessed by a parliamentary subcommittee. Robert had helped plant the seeds of the campaign, but he'd played no real part in it; other people had taken up the cause. In a matter of months, it was possible that Quint's cage would be smashed, at least for everyone in Britain.

The prospect filled him with a kind of vertigo. He might have broken the laws at every opportunity, but they had still molded him. The cage might not have left him crippled, but he'd be lying to himself if he denied that he'd been stunted.

He said, "Is that what happened, in your past? I ended up in some . . . lifelong partnership?" As he spoke the words, his mouth went dry, and he was

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suddenly afraid that the answer would be yes. *With Chris. The life he'd missed out on was a life of happiness with Chris.*

"No."

"Then . . . what?" he pleaded. "What did I do? How did I live?" He caught himself, suddenly self-conscious, but added, "You can't blame me for being curious."

Helen said gently, "You don't want to know what you can't change. All of that is part of your own causal past now, as much as it is of mine."

"If it's part of my own history," Robert countered, "don't I deserve to know it? This man wasn't me, but he brought you to me."

Helen considered this. "You accept that he was someone else? Not someone whose actions you're responsible for?"

"Of course."

She said, "There was a trial, in 1952. For 'Gross Indecency contrary to Section 11 of the Criminal Amendment Act of 1885.' He wasn't imprisoned, but the court ordered hormone treatments."

"*Hormone treatments?*" Robert laughed. "What—testosterone, to make him more of a man?"

"No, estrogen. Which in men reduces the sex drive. There are side-effects, of course. Gynecomorphism, among other things."

Robert felt physically sick. *They'd chemically castrated him, with drugs that had made him sprout breasts.* Of all the bizarre abuse to which he'd been subjected, nothing had been as horrifying as that.

Helen continued, "The treatment lasted six months, and the effects were all temporary. But two years later, he took his own life. It was never clear exactly why."

Robert absorbed this in silence. He didn't want to know anything more.

After a while, he said, "How do you bear it? Knowing that in some branch or other, every possible form of humiliation is being inflicted on someone?"

Helen said, "I don't *bear it.* I change it. That's why I'm here."

Robert bowed his head. "I know. And I'm grateful that our histories collided. But . . . how many histories *don't?*" He struggled to find an example, though it was almost too painful to contemplate; since their first conversation, it was a topic he'd deliberately pushed to the back of his mind. "There's not just an unchangeable Auschwitz in each of our pasts, there are an astronomical number of others—along with an astronomical number of things that are even worse."

Helen said bluntly, "That's not true."

"What?" Robert looked up at her, startled.

She walked to the blackboard and erased it. "Auschwitz has happened, for both of us, and no one I'm aware of has ever prevented it—but that doesn't mean that *nobody* stops it, anywhere." She began sketching a network of fine lines on the blackboard. "You and I are having this conversation in countless microhistories—sequences of events where various different things happen with subatomic particles throughout the universe—but that's irrelevant to us, we can't tell those strands apart, so we might as well treat them all as one history." She pressed the chalk down hard to make a thick streak that covered everything she'd drawn. "The quantum decoherence people call this 'coarse graining.' Summing over all these indistinguishable details is what gives rise to classical physics in the first place.

"Now, 'the two of us' would have first met in many perceivably different coarse-grained histories—and furthermore, you've since diverged by mak-

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ing different choices, and experiencing different external possibilities, after those events." She sketched two intersecting ribbons of coarse-grained histories, and then showed each history diverging further.

"World War II and the Holocaust certainly happened in both of *our* pasts—but that's no proof that the total is so vast that it might as well be infinite. Remember, what stops us successfully intervening is the fact that we're reaching back to a point where some of the parallel interventions start to bite their own tail. So when we fail, it can't be counted twice: it's just confirming what we already know."

Robert protested, "But what about all the versions of thirties Europe that don't happen to lie in either your past or mine? Just because we have no direct evidence for a Holocaust in those branches, that hardly makes it unlikely."

Helen said, "Not unlikely *per se,* without intervention. But not fixed in stone either. We'll keep trying, refining the technology, until we can reach branches where there's no overlap with our own past in the thirties. And there must be other, separate ribbons of intervention that happen in histories we can never even know about."

Robert was elated. He'd imagined himself clinging to a rock of improbable good fortune in an infinite sea of suffering—struggling to pretend, for the sake of his own sanity, that the rock was all there was. But what lay around him was not inevitably worse; it was merely unknown. In time, he might even play a part in ensuring that every last tragedy was *not* repeated across billions of worlds.

He reexamined the diagram. "Hang on. Intervention doesn't end divergence, though, does it? You reached *us,* a year ago, but in at least some of the histories spreading out from that moment, won't we still have suffered all kinds of disasters, and reacted in all kinds of self-defeating ways?"

"Yes," Helen conceded, "but fewer than you might think. If you merely listed every sequence of events that superficially appeared to have a nonzero probability, you'd end up with a staggering catalog of absurdist tragedies. But when you calculate everything more carefully, and take account of Planck-scale effects, it turns out to be nowhere near as bad. There are *no* coarse-grained histories where boulders assemble themselves out of dust and rain from the sky, or everyone in London or Madras goes mad and slaughters their children. Most macroscopic systems end up being quite robust—people included. Across histories, the range of natural disasters, human stupidity, and sheer bad luck isn't overwhelmingly greater than the range you're aware of from this history alone."

Robert laughed. "And that's not bad enough?"

"Oh, it is. But that's the best thing about the form I've taken."

"I'm sorry?"

Helen tipped her head and regarded him with an expression of disappointment. "You know, you're still not as quick on your feet as I'd expected."

Robert's face burned, but then he realized what he'd missed, and his resentment vanished.

"*You don't diverge?* Your hardware is designed to end the process? Your environment, your surroundings, will still split you into different histories—but on a coarse-grained level, you don't contribute to the process yourself?"

"That's right."

Robert was speechless. Even after a year, she could still toss him a hand grenade like this.

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Helen said, "I can't help living in many worlds; that's beyond my control. But I do know that I'm one person. Faced with a choice that puts me on a knife-edge, I know I won't split and take every path."

Robert hugged himself, suddenly cold. "Like I do. Like I have. Like all of us poor creatures of flesh."

Helen came and sat beside him. "Even that's not irrevocable. Once you've taken this form—if that's what you choose—you can meet your other selves, reverse some of the scatter. Give some a chance to undo what they've done."

This time, Robert grasped her meaning at once. "Gather myself together? Make myself whole?"

Helen shrugged. "If it's what you want. If you see it that way."

He stared back at her, disoriented. Touching the bedrock of physics was one thing, but this possibility was too much to take in.

Someone knocked on the study door. The two of them exchanged wary glances, but it wasn't Quint, back for more punishment. It was a porter bearing a telegram.

When the man had left, Robert opened the envelope.

"Bad news?" Helen asked.

He shook his head. "Not a death in the family, if that's what you meant. It's from John Hamilton. He's challenging me to a debate. On the topic 'Can A Machine Think?'"

"What, at some university function?"

"No. On the BBC. Four weeks from tomorrow." He looked up. "Do you think I should do it?"

"Radio or television?"

Robert reread the message. "Television."

Helen smiled. "Definitely. I'll give you some tips."

"On the subject?"

"No! That would be cheating." She eyed him appraisingly. "You can start by throwing out your electric razor. Get rid of the permanent five o'clock shadow."

Robert was hurt. "Some people find that quite attractive."

Helen replied firmly, "Trust me on this."

The BBC sent a car to take Robert down to London. Helen sat beside him in the back seat.

"Are you nervous?" she asked.

"Nothing that an hour of throwing up won't cure."

Hamilton had suggested a live broadcast, "to keep things interesting," and the producer had agreed. Robert had never been on television; he'd taken part in a couple of radio discussions on the future of computing, back when the Mark I had first come into use, but even those had been taped.

Hamilton's choice of topic had surprised him at first, but in retrospect it seemed quite shrewd. A debate on the proposition that "Modern Science is the Devil's Work" would have brought howls of laughter from all but the most pious viewers, whereas the purely metaphorical claim that "Modern Science is a Faustian Pact" would have had the entire audience nodding sagely in agreement, while carrying no implications whatsoever. If you weren't going to take the whole dire fairy tale literally, everything was "a Faustian Pact" in some sufficiently watered-down sense: everything had a potential downside, and this was as pointless to assert as it was easy to demonstrate.

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Robert had met considerable incredulity, though, when he'd explained to journalists where his own research was leading. To date, the press had treated him as a kind of eccentric British Edison, churning out inventions of indisputable utility, and no one seemed to find it at all surprising or alarming that he was also, frankly, a bit of a loon. But Hamilton would have a chance to exploit, and reshape, that perception. If Robert insisted on defending his goal of creating machine intelligence, not as an amusing hobby that might have been chosen by a public relations firm to make him appear endearingly daft, but as both the ultimate vindication of materialist science and the logical endpoint of most of his life's work, Hamilton could use a victory tonight to cast doubt on everything Robert had done, and everything he symbolized. By asking, not at all rhetorically, "Where will this all end?", he was inviting Robert to step forward and hang himself with the answer.

The traffic was heavy for a Sunday evening, and they arrived at the Shepherd's Bush studios with only fifteen minutes until the broadcast. Hamilton had been collected by a separate car, from his family home near Oxford. As they crossed the studio, Robert spotted him, conversing intensely with a dark-haired young man.

He whispered to Helen, "Do you know who that is, with Hamilton?"

She followed his gaze, then smiled cryptically. Robert said, "What? Do you recognize him from somewhere?"

"Yes, but I'll tell you later."

As the make-up woman applied powder, Helen ran through her long list of rules again. "Don't stare into the camera, or you'll look like you're peddling soap powder. But don't avert your eyes. You don't want to look shifty."

The make-up woman whispered to Robert, "Everyone's an expert."

"Annoying, isn't it?" he confided.

Michael Polanyi, an academic philosopher who was well-known to the public after presenting a series of radio talks, had agreed to moderate the debate. Polanyi popped into the make-up room, accompanied by the producer; they chatted with Robert for a couple of minutes, setting him at ease and reminding him of the procedure they'd be following.

They'd only just left him when the floor manager appeared. "We need you in the studio now, please, Professor." Robert followed her, and Helen pursued him part of the way. "Breathe slowly and deeply," she urged him.

"As if *you'd* know!" he snapped.

Robert shook hands with Hamilton, then took his seat on one side of the podium. Hamilton's young adviser had retreated into the shadows; Robert glanced back to see Helen watching from a similar position. It was like a duel: they both had seconds. The floor manager pointed out the studio monitor, and, as Robert watched, it was switched between the feeds from two cameras: a wide shot of the whole set, and a closer view of the podium, including the small blackboard on a stand beside it. He'd once asked Helen whether television had progressed to far greater levels of sophistication in her branch of the future, once the pioneering days were left behind, but the question had left her uncharacteristically tongue-tied.

The floor manager retreated behind the cameras, called for silence, then counted down from ten, mouthing the final numbers.

The broadcast began with an introduction from Polanyi: concise, witty, and non-partisan. Then Hamilton stepped up to the podium. Robert watched him directly while the wide-angle view was being transmitted, so

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as not to appear rude or distracted. He only turned to the monitor when he was no longer visible himself.

"Can a machine think?" Hamilton began. "My intuition tells me: *no*. My heart tells me: *no*. I'm sure that most of you feel the same way. But that's not enough, is it? In this day and age, we aren't allowed to rely on our hearts for anything. We need something scientific. We need some kind of *proof*.

"Some years ago, I took part in a debate at Oxford University. The issue then was not whether machines might behave like people, but whether people themselves might *be* mere machines. Materialists, you see, claim that we are all just a collection of purposeless atoms, colliding at random. Everything we do, everything we feel, everything we say, comes down to some sequence of events that might as well be the spinning of cogs, or the opening and closing of electrical relays.

"To me, this was self-evidently false. What point could there be, I argued, in even conversing with a materialist? By his own admission, the words that came out of his mouth would be the result of nothing but a mindless, mechanical process! By his own theory, he could have no reason to think that those words would be the truth! Only believers in a transcendent human soul could claim any interest in the truth."

Hamilton nodded slowly, a penitent's gesture. "I was wrong, and I was put in my place. This might be self-evident to *me,* and it might be self-evident to *you,* but it's certainly not what philosophers call an 'analytical truth': it's not actually a nonsense, a contradiction in terms, to believe that we are mere machines. There might, there just *might,* be some reason why the words that emerge from a materialist's mouth are truthful, despite their origins lying entirely in unthinking matter.

"There might." Hamilton smiled wistfully. "I had to concede that possibility, because I only had my instinct, my gut feeling, to tell me otherwise.

"But the reason I only had my instinct to guide me was because I'd failed to learn of an event that had taken place many years before. A discovery made in 1930, by an Austrian mathematician named Kurt Gödel."

Robert felt a shiver of excitement run down his spine. He'd been afraid that the whole contest would degenerate into theology, with Hamilton invoking Aquinas all night—or Aristotle, at best. But it looked as if his mysterious adviser had dragged him into the twentieth century, and they were going to have a chance to debate the real issues after all.

"What is it that we *know* Professor Stoney's computers can do, and do well?" Hamilton continued. "Arithmetic! In a fraction of a second, they can add up a million numbers. Once we've told them, very precisely, what calculations to perform, they'll complete them in the blink of an eye—even if those calculations would take you or me a lifetime.

"But do these machines *understand* what it is they're doing? Professor Stoney says, 'Not yet. Not right now. Give them time. Rome wasn't built in a day.'" Hamilton nodded thoughtfully. "Perhaps that's fair. His computers are only a few years old. They're just babies. Why should they understand anything, so soon?

"But let's stop and think about this a bit more carefully. A computer, as it stands today, is simply a machine that does arithmetic, and Professor Stoney isn't proposing that they're going to sprout new kinds of brains all on their own. Nor is he proposing *giving* them anything really new. He can already let them look at the world with television cameras, turning the pic-

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tures into a stream of numbers describing the brightness of different points on the screen . . . on which the computer can then perform *arithmetic.* He can already let them speak to us with a special kind of loudspeaker, to which the computer feeds a stream of numbers to describe how loud the sound should be . . . a stream of numbers produced by more *arithmetic.*

"So the world can come into the computer, as numbers, and words can emerge, as numbers too. All Professor Stoney hopes to add to his computers is a 'cleverer' way to do the arithmetic that takes the first set of numbers and churns out the second. It's that 'clever arithmetic,' he tells us, that will make these machines think."

Hamilton folded his arms and paused for a moment. "What are we to make of this? Can *doing arithmetic,* and nothing more, be enough to let a machine *understand* anything? My instinct certainly tells me no, but who am I that you should trust my instinct?

"So, let's narrow down the question of understanding, and to be scrupulously fair, let's put it in the most favorable light possible for Professor Stoney. If there's one thing a computer *ought* to be able to understand—as well as us, if not better—it's arithmetic itself. If a computer could think at all, it would surely be able to grasp the nature of its own best talent.

"The question, then, comes down to this: can you *describe* all of arithmetic, *using* nothing but arithmetic? Thirty years ago—long before Professor Stoney and his computers came along—Professor Gödel asked himself exactly that question.

"Now, you might be wondering how anyone could even *begin* to describe the rules of arithmetic, using nothing but arithmetic itself." Hamilton turned to the blackboard, picked up the chalk, and wrote two lines:

If x+z = y+z
then x = y

"This is an important rule, but it's written in symbols, not numbers, because it has to be true for *every* number, every x, y, and z. But Professor Gödel had a clever idea: why not use a code, like spies use, where every symbol is assigned a number?" Hamilton wrote:

The code for "a" is 1.
The code for "b" is 2.

"And so on. You can have a code for every letter of the alphabet, and for all the other symbols needed for arithmetic: plus signs, equals signs, that kind of thing. Telegrams are sent this way every day, with a code called the Baudot code, so there's really nothing strange or sinister about it.

"All the rules of arithmetic that we learned at school can be written with a carefully chosen set of symbols, which can then be translated into numbers. Every question as to what does or does not *follow from* those rules can then be seen anew, as a question about numbers. If *this* line follows from *this* one," Hamilton indicated the two lines of the cancellation rule, "we can see it in the relationship between their code numbers. We can judge each inference, and declare it valid or not, purely by doing arithmetic.

"So, given *any* proposition at all about arithmetic—such as the claim that 'there are infinitely many prime numbers'—we can restate the notion that we have a proof for that claim in terms of code numbers. If the code number

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for our claim is x, we can say 'There is a number p, ending with the code number x, that passes our test for being the code number of a valid proof.'"

Hamilton took a visible breath.

"In 1930, Professor Gödel used this scheme to do something rather ingenious." He wrote on the blackboard:

There DOES NOT EXIST a number p meeting the following condition:
p is the code number of a valid proof of this claim.

"Here is a claim about arithmetic, about numbers. It has to be either true or false. So let's start by supposing that it happens to be true. Then there *is no* number p that is the code number for a proof of this claim. So this is a true statement about arithmetic, but it can't be proved merely by *doing* arithmetic!"

Hamilton smiled. "If you don't catch on immediately, don't worry; when I first heard this argument from a young friend of mine, it took a while for the meaning to sink in. But remember: the only hope a computer has for understanding *anything* is by doing arithmetic, and we've just found a statement that *cannot* be proved with mere arithmetic.

"Is this statement really true, though? We mustn't jump to conclusions, we mustn't damn the machines too hastily. Suppose this claim is false! Since it claims there is no number p that is the code number of its own proof, to be false there would have to be such a number, after all. And that number would encode the 'proof' of an acknowledged falsehood!"

Hamilton spread his arms triumphantly. "You and I, like every schoolboy, know that you can't prove a falsehood from sound premises—and if the premises of arithmetic aren't sound, what is? So *we* know, as a matter of certainty, that this statement is true.

"Professor Gödel was the first to see this, but with a little help and perseverance, any educated person can follow in his footsteps. *A machine could never do that.* We might divulge to a machine our own knowledge of this fact, offering it as something to be taken on trust, but the machine could neither stumble on this truth for itself, nor truly comprehend it when we offered it as a gift.

"You and I *understand* arithmetic, in a way that no electronic calculator ever will. What hope has a machine, then, of moving beyond its own most favorable milieu and comprehending any wider truth?

"None at all, ladies and gentlemen. Though this detour into mathematics might have seemed arcane to you, it has served a very down-to-Earth purpose. It has proved—beyond refutation by even the most ardent materialist or the most pedantic philosopher—what we common folk knew all along: no machine will ever think."

Hamilton took his seat. For a moment, Robert was simply exhilarated; coached or not, Hamilton had grasped the essential features of the incompleteness proof, and presented them to a lay audience. What might have been a night of shadow-boxing—with no blows connecting, and nothing for the audience to judge but two solo performances in separate arenas—had turned into a genuine clash of ideas.

As Polanyi introduced him and he walked to the podium, Robert realized that his usual shyness and self-consciousness had evaporated. He was filled with an altogether different kind of tension: he sensed more acutely than ever what was at stake.

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When he reached the podium, he adopted the posture of someone about to begin a prepared speech, but then he caught himself, as if he'd forgotten something. "Bear with me for a moment." He walked around to the far side of the blackboard and quickly wrote a few words on it, upside-down. Then he resumed his place.

"Can a machine think? Professor Hamilton would like us to believe that he's settled the issue once and for all, by coming up with a statement that *we* know is true, but a particular machine—programmed to explore the theorems of arithmetic in a certain rigid way—would never be able to produce. Well . . . we all have our limitations." He flipped the blackboard over to reveal what he'd written on the opposite side:

If Robert Stoney speaks these words, he will NOT be telling the truth.

He waited a few beats, then continued.

"What I'd like to explore, though, is not so much a question of limitations, as of opportunities. How exactly is it that we've all ended up with this mysterious ability to know that Gödel's statement is true? Where does this advantage, this great insight, come from? From our souls? From some immaterial entity that no machine could ever possess? Is that the only possible source, the only conceivable explanation? Or might it come from something a little less ethereal?

"As Professor Hamilton explained, we believe Gödel's statement is true because we trust the rules of arithmetic not to lead us into contradictions and falsehoods. But where does that trust come from? How does it arise?"

Robert turned the blackboard back to Hamilton's side, and pointed to the cancellation rule. "If x plus z equals y plus z, then x equals y. Why is this so *reasonable?* We might not learn to put it quite like this until we're in our teens, but if you showed a young child two boxes—without revealing their contents—added an equal number of shells, or stones, or pieces of fruit to both, and then let the child look inside to see that each box now contained the same number of items, it wouldn't take any formal education for the child to understand that the two boxes must have held the same number of things to begin with.

"The child knows, we all know, how a certain kind of object behaves. Our lives are steeped in direct experience of whole numbers: whole numbers of coins, stamps, pebbles, birds, cats, sheep, buses. If I tried to persuade a six-year-old that I could put three stones in a box, remove one of them, and be left with four . . . he'd simply laugh at me. Why? It's not merely that he's sure to have taken one thing away from three to get two, on many prior occasions. Even a child understands that some things that appear reliable will eventually fail: a toy that works perfectly, day after day, for a month or a year, can still break. But not arithmetic, not taking one from three. He can't even picture *that* failing. Once you've lived in the world, once you've seen how it works, the failure of arithmetic becomes unimaginable.

"Professor Hamilton suggests that this is down to our souls. But what would he say about a child reared in a world of water and mist, never in the company of more than one person at a time, never taught to count on his fingers and toes. I doubt that such a child would possess the same certainty that you and I have, as to the impossibility of arithmetic ever leading him astray. To banish whole numbers entirely from his world would require

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very strange surroundings, and a level of deprivation amounting to cruelty, but would that be enough to rob a child of his *soul?*

"A computer, programmed to pursue arithmetic as Professor Hamilton has described, is subject to far more deprivation than that child. If I'd been raised with my hands and feet tied, my head in a sack, and someone shouting orders at me, I doubt that I'd have much grasp of reality—and I'd still be better prepared for the task than such a computer. It's a great mercy that a machine treated that way wouldn't be able to think: if it could, the shackles we'd placed upon it would be criminally oppressive!

"But that's hardly the fault of the computer, or a revelation of some irreparable flaw in its nature. If we want to judge the potential of our machines with any degree of honesty, we have to play fair with them, not saddle them with restrictions that we'd never dream of imposing on ourselves. There really is no point comparing an eagle with a spanner, or a gazelle with a washing machine: it's our jets that fly and our cars that run, albeit in quite different ways than any animal.

"*Thought* is sure to be far harder to achieve than those other skills, and to do so we might need to mimic the natural world far more closely. But I believe that once a machine is endowed with facilities resembling the inborn tools for learning that we all have as our birthright, and is set free to learn the way a child learns, through experience, observation, trial and error, hunches and failures—instead of being handed a list of instructions that it has no choice but to obey—we will finally be in a position to compare like with like.

"When that happens, and we can meet and talk and argue with these machines—about arithmetic, or any other topic—there'll be no need to take the word of Professor Gödel, or Professor Hamilton, or myself, for anything. We'll invite them down to the local pub, and interrogate them in person. And if we play fair with them, we'll use the same experience and judgment we use with any friend, or guest, or stranger, to decide for ourselves whether or not they can think."

The BBC put on a lavish assortment of wine and cheese in a small room off the studio. Robert ended up in a heated argument with Polanyi, who revealed himself to be firmly on the negative side, while Helen flirted shamelessly with Hamilton's young friend, who turned out to have a Ph.D. in algebraic geometry from Cambridge; he must have completed the degree just before Robert had come back from Manchester. After exchanging some polite formalities with Hamilton, Robert kept his distance, sensing that any further contact would not be welcome.

An hour later, though, after getting lost in the maze of corridors on his way back from the toilets, Robert came across Hamilton sitting alone in the studio, weeping.

He almost backed away in silence, but Hamilton looked up and saw him. With their eyes locked, it was impossible to retreat.

Robert said, "It's your wife?" He'd heard that she'd been seriously ill, but the gossip had included a miraculous recovery. Some friend of the family had lain hands on her a year ago, and she'd gone into remission.

Hamilton said, "She's dying."

Robert approached and sat beside him. "From what?"

"Breast cancer. It's spread throughout her body. Into her bones, into her lungs, into her liver." He sobbed again, a helpless spasm, then caught him-

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self angrily. "*Suffering is the chisel God uses to shape us.* What kind of idiot comes up with a line like that?"

Robert said, "I'll talk to a friend of mine, an oncologist at Guy's Hospital. He's doing a trial of a new genetic treatment."

Hamilton stared at him. "One of your *miracle cures?*"

"No, no. I mean, only very indirectly."

Hamilton said angrily, "She won't take your poison."

Robert almost snapped back: *She won't? Or you won't let her?* But it was an unfair question. In some marriages, the lines blurred. It was not for him to judge the way the two of them faced this together.

"They go away in order to be with us in a new way, even closer than before." Hamilton spoke the words like a defiant incantation, a declaration of faith that would ward off temptation, whether or not he entirely believed it.

Robert was silent for a while, then he said, "I lost someone close to me, when I was a boy. And I thought the same thing. I thought he was still with me, for a long time afterward. Guiding me. Encouraging me." It was hard to get the words out; he hadn't spoken about this to anyone for almost thirty years. "I dreamed up a whole theory to explain it, in which 'souls' used quantum uncertainty to control the body during life, and communicate with the living after death, without breaking any laws of physics. The kind of thing every science-minded seventeen-year-old probably stumbles on, and takes seriously for a couple of weeks, before realizing how nonsensical it is. But I had a good reason not to see the flaws, so I clung to it for almost two years. Because I missed him so much, it took me that long to understand what I was doing, how I was deceiving myself."

Hamilton said pointedly, "If you'd not tried to explain it, you might never have lost him. He might still be with you now."

Robert thought about this. "I'm glad he's not, though. It wouldn't be fair to either of us."

Hamilton shuddered. "Then you can't have loved him very much, can you?" He put his head in his arms. "Just fuck off, now, will you?"

Robert said, "What exactly would it take, to prove to you that I'm not in league with the devil?"

Hamilton turned red eyes on him and announced triumphantly, "Nothing will do that! I saw what happened to Quint's gun!"

Robert sighed. "That was a conjuring trick. Stage magic, not black magic."

"Oh yes? Show me how it's done, then. Teach me how to do it, so I can impress my friends."

"It's rather technical. It would take all night."

Hamilton laughed humorlessly. "You can't deceive me. I saw through you from the start."

"Do you think X-rays are Satanic? Penicillin?"

"Don't treat me like a fool. There's no comparison."

"*Why not?* Everything I've helped develop is part of the same continuum. I've read some of your writing on medieval culture, and you're always berating modern commentators for presenting it as unsophisticated. No one really thought the Earth was flat. No one really treated every novelty as witchcraft. So why view any of my work any differently than a fourteenth-century man would view twentieth-century medicine?"

Hamilton replied, "If a fourteenth-century man was suddenly faced with

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twentieth-century medicine, don't you think he'd be entitled to wonder how it had been revealed to his contemporaries?"

Robert shifted uneasily on his chair. Helen hadn't sworn him to secrecy, but he'd agreed with her view: it was better to wait, to spread the knowledge that would ground an understanding of what had happened, before revealing any details of the contact between branches.

But this man's wife was dying, needlessly. And Robert was tired of keeping secrets. Some wars required it, but others were better won with honesty.

He said, "I know you hate H.G. Wells. But what if he was right, about one little thing?"

Robert told him everything, glossing over the technicalities but leaving out nothing substantial. Hamilton listened without interrupting, gripped by a kind of unwilling fascination. His expression shifted from hostile to incredulous, but there were also hints of begrudging amazement, as if he could at least appreciate some of the beauty and complexity of the picture Robert was painting.

But when Robert had finished, Hamilton said merely, "You're a grand liar, Stoney. But what else should I expect, from the King of Lies?"

Robert was in a somber mood on the drive back to Cambridge. The encounter with Hamilton had depressed him, and the question of who'd swayed the nation in the debate seemed remote and abstract in comparison.

Helen had taken a house in the suburbs, rather than inviting scandal by cohabiting with him, though her frequent visits to his rooms seemed to have had almost the same effect. Robert walked her to the door.

"I think it went well, don't you?" she said.

"I suppose so."

"I'm leaving tonight," she added casually. "This is goodbye."

"What?" Robert was staggered. "Everything's still up in the air! I still need you!"

She shook her head. "You have all the tools you need, all the clues. And plenty of local allies. There's nothing truly urgent I could tell you, now, that you couldn't find out just as quickly on your own."

Robert pleaded with her, but her mind was made up. The driver beeped the horn; Robert gestured to him impatiently.

"You know, my breath's frosting visibly," he said, "and you're producing nothing. You really ought to be more careful."

She laughed. "It's a bit late to worry about that."

"Where will you go? Back home? Or off to twist another branch?"

"Another branch. But there's something I'm planning to do on the way."

"What's that?"

"Do you remember once, you wrote about an Oracle? A machine that could solve the halting problem?"

"Of course." Given a device that could tell you in advance whether a given computer program would halt, or go on running forever, you'd be able to prove or disprove any theorem whatsoever about the integers: the Goldbach conjecture, Fermat's Last Theorem, anything. You'd simply show this "Oracle" a program that would loop through all the integers, testing every possible set of values and only halting if it came to a set that violated the conjecture. You'd never need to run the program itself; the Oracle's verdict on whether or not it halted would be enough.

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Such a device might or might not be possible, but Robert had proved more than twenty years before that no ordinary computer, however ingeniously programmed, would suffice. If program H could always tell you in a finite time whether or not program X would halt, you could tack on a small addition to H to create program Z, which perversely and deliberately went into an infinite loop whenever it examined a program that halted. If Z examined itself, it would either halt eventually, or run forever. But either possibility contradicted the alleged powers of program H: if Z actually ran forever, it would be because H had claimed that it wouldn't, and *vice versa*. Program H could not exist.

"Time travel," Helen said, "gives me a chance to become an Oracle. There's a way to exploit the inability to change your own past, a way to squeeze an infinite number of timelike paths—none of them closed, but some of them arbitrarily near to it—into a finite physical system. Once you do that, you can solve the halting problem."

"How?" Robert's mind was racing. "And once you've done that . . . what about higher cardinalities? An Oracle for Oracles, able to test conjectures about the real numbers?"

Helen smiled enigmatically. "The first problem should only take you forty or fifty years to solve. As for the rest," she pulled away from him, moving into the darkness of the hallway, "what makes you think I know the answer myself?" She blew him a kiss, then vanished from sight.

Robert took a step toward her, but the hallway was empty.

He walked back to the car, sad and exalted, his heart pounding.

The driver asked wearily, "Where to now, sir?"

Robert said, "Further up, and further in."

4

The night after the funeral, Jack paced the house until three A.M. When would it be bearable? *When?* She'd shown more strength and courage, dying, than he felt within himself right now. But she'd share it with him, in the weeks to come. She'd share it with them all.

In bed, in the darkness, he tried to sense her presence around him. But it was forced, it was premature. It was one thing to have faith that she was watching over him, but quite another to expect to be spared every trace of grief, every trace of pain.

He waited for sleep. He needed to get some rest before dawn, or how would he face her children in the morning?

Gradually, he became aware of someone standing in the darkness at the foot of the bed. As he examined and reexamined the shadows, he formed a clear image of the apparition's face.

It was his own. Younger, happier, surer of himself.

Jack sat up. "What do you want?"

"I want you to come with me." The figure approached; Jack recoiled, and it halted.

"Come with you, where?" Jack demanded.

"To a place where she's waiting."

Jack shook his head. "No. I don't believe you. She said she'd come for me herself, when it was time. She said she'd guide me."

"She didn't understand, then," the apparition insisted gently. "She didn't

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know I could fetch you myself. Do you think I'd send her in my place? Do you think I'd shirk the task?"

Jack searched the smiling, supplicatory face. "Who are you?" *His own soul, in Heaven, remade?* Was this a gift God offered everyone? To meet, before death, the very thing you would become—if you so chose? So that even this would be an act of free will?

The apparition said, "Stoney persuaded me to let his friend treat Joyce. We lived on, together. More than a century has passed. And now we want you to join us."

Jack choked with horror. "No! This is a trick! *You're the Devil!*"

The thing replied mildly, "There is no Devil. And no God, either. Just people. But I promise you: people with the powers of gods are kinder than any god we ever imagined."

Jack covered his face. "Leave me be." He whispered fervent prayers, and waited. It was a test, a moment of vulnerability, but God wouldn't leave him naked like this, face-to-face with the Enemy, for longer than he could endure.

He uncovered his face. The thing was still with him.

It said, "Do you remember, when your faith came to you? The sense of a shield around you melting away, like armor you'd worn to keep God at bay?"

"Yes." Jack acknowledged the truth defiantly; he wasn't frightened that this abomination could see into his past, into his heart.

"That took strength: to admit that you needed God. But it takes the same kind of strength, again, to understand that *some needs can never be met.* I can't promise you Heaven. We have no disease, we have no war, we have no poverty. But we have to find our own love, our own goodness. There is no final word of comfort. We only have each other."

Jack didn't reply; this blasphemous fantasy wasn't even worth challenging. He said, "I know you're lying. Do you really imagine that I'd leave the boys alone here?"

"They'd go back to America, back to their father. How many years do you think you'd have with them, if you stay? They've already lost their mother. It would be easier for them now, a single clean break."

Jack shouted angrily, "Get out of my house!"

The thing came closer, and sat on the bed. It put a hand on his shoulder. Jack sobbed, "Help me!" But he didn't know whose aid he was invoking any more.

"Do you remember the scene in *The Seat of Oak?* When the Harpy traps everyone in her cave underground, and tries to convince them that there is no Nescia? Only this drab underworld is real, she tells them. Everything else they think they've seen was just make-believe." Jack's own young face smiled nostalgically. "And we had dear old Shrugweight reply: he didn't think much of this so-called 'real world' of hers. And even if she was right, since four little children could make up a better world, he'd rather go on pretending that their imaginary one was real.

"But we had it all upside down! The real world is richer, and stranger, and more beautiful than anything ever imagined. Milton, Dante, John the Divine are the ones who trapped you in a drab, gray underworld. That's where you are now. But if you give me your hand, I can pull you out."

Jack's chest was bursting. *He couldn't lose his faith. He'd kept it through worse than this. He'd kept it through every torture and indignity God had in-*

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flicted on his wife's frail body. No one could take it from him now. He crooned to himself, "In my time of trouble, He will find me."

The cool hand tightened its grip on his shoulder. "You can be with her, now. Just say the word, and you will become a part of me. I will take you inside me, and you will see through my eyes, and we will travel back to the world where she still lives."

Jack wept openly. "Leave me in peace! Just leave me to mourn her!"

The thing nodded sadly. "If that's what you want."

"I do! *Go!*"

"When I'm sure."

Suddenly, Jack thought back to the long rant Stoney had delivered in the studio. Every choice went every way, Stoney had claimed. No decision could ever be final.

"Now I know you're lying!" he shouted triumphantly. "If you believed everything Stoney told you, how could my choice ever mean a thing? I would always say yes to you, and I would always say no! It would all be the same!"

The apparition replied solemnly, "While I'm here with you, touching you, *you can't be divided.* Your choice will count."

Jack wiped his eyes, and gazed into its face. It seemed to believe every word it was speaking. What if this truly was his metaphysical twin, speaking as honestly as he could, and not merely the Devil in a mask? Perhaps there was a grain of truth in Stoney's awful vision; perhaps this was another version of himself, a living person who honestly believed that the two of them shared a history.

Then it was a visitor sent by God, to humble him. To teach him compassion toward Stoney. To show Jack that he, too, with a little less faith, and a little more pride, might have been damned forever.

Jack stretched out a hand and touched the face of this poor lost soul. *There, but for the grace of God, go I.*

He said, "I've made my choice. Now leave me." O

Author's note: *where the lives of the fictional characters of this story parallel those of real historical figures, I've drawn on biographies by Andrew Hodges and A.N. Wilson. The self-dual formulation of general relativity was discovered by Abhay Ashtekar in 1986, and has since led to ground-breaking developments in quantum gravity, but the implications drawn from it here are fanciful.*

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ON BOOKS

Paul Di Filippo

The Thundering Herd

It's a rare essay that, while perfectly illuminating its particular and limited subject matter, can also embody as subtext an entire philosophy of living. Yet such an accomplishment can be found twice-over in Samuel Delany's *Times Square Red, Times Square Blue* (NYU, hardcover, $19.95, 229 pages, ISBN 0-8147-1919-8), his exegesis of the radical transformations that have overtaken New York's Crossroads of the World. The first of these paired essays is more anecdotal than analytical, while the second reverses those proportions. Yet both partake of the same spirit of bold and fearless personal grappling with the protean shapes of reality. Advocating an utopian openness as opposed to a controlling net of strictures, Delany functions as a clear-eyed and compassionate anthropologist for a society often afraid to look at its own secret desires.

Readers of Delany's first graphic novel, *Empire* (1978), a co-production with artist Howard Chaykin, might be surprised by Delany's second such work, *Bread & Wine* (Juno Books, trade, $14.99, 55 pages, ISBN 1-890451-02-9), since this book resides as far from that earlier space opera as possible. However, those familiar with Delany's powerful autobiography, *The Motion of Light in Water* (1988), will find themselves on familiar territory. *Bread & Wine* is the poignant tale of how Delany became acquainted with a homeless man named Dennis, and how the friendship developed into love. Delany's prose is calmly journalistic, yet visceral and poetic, while Mia Wolff's black-and-white drawings harmonize beautifully. (The fantastic imagery on page 38 is my favorite scene, a startling depiction of freedom.) Alan Moore's introduction, an affectionate defense of reality-rooted dreaming, makes clear just why Delany and his writings matter so much.

Reading Frank Robinson's massive new illustrated history book, *Science Fiction of the 20th Century* (Collectors Press, hardcover, $59.95, 256 pages, ISBN 1-888054-29-8), is like riding a speeding cruise missile as it dips and swerves through mountainous terrain: the ride is wild, the peaks stand out while the details blur, and it's over with a bang before you know it! Robinson's follow-up to 1998's *Pulp Culture* features a greater quantity of lucid loving text than the earlier book, but does not scant on stunning visuals, offering a similar wealth of images, concentrating mostly on printed incarnations of SF. Also, an index remedies the earlier book's only defect. Assembling many rare magazine and book covers to illustrate the highlights of his tour through our stefnal century, Robinson both amuses and enlightens us. Highly recommended.

A pre-Campbellian rarity back in print: Jack Williamson's *The Stone from the Green Star* (Gryphon, trade, $20.00, 184 pages, ISBN 1-58250-025-8) contains all the Gernsbackian heroics anyone could crave. Dick Smith, transported by a mysterious beam two million years into the future, helps kindly yet master-

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ful old savant Midos Ken and his beautiful daughter Thon Ahrora win immortality for all mankind in the face of the dire desires of Garo Nark, Lord of the Dark Star. With touches of Lovecraft and Hodgson, this galactic romance reminds us of an era when our hearts were young, our senses fresh—and fiendish vampires of living flame could be found 'round every crater!

Fittingly, Jack Williamson provides a foreword to *Pioneers of Wonder* (Prometheus Books, hardcover, $24.95, 405 pages, ISBN 1-57392-702-3), Eric Leif Davin's labor of love that records "conversations with the founders of science fiction." In probing the memories of such near-forgotten pivotal figures as editors Charles Hornig and David Lasser, the canny and caring Davin rescues important data from the maw of time in an entertaining fashion. His conversation with Stanley Weinbaum's widow, Margaret Weinbaum Kay, particularly delights. This book offers a winsome window onto an age when hardcore SF fans numbered roughly one hundred brave souls, and engenders nostalgia for a time never lived by the majority of its potential readers.

Postmodern delights mixed with old-fashioned narrative pleasures await you in Jeff VanderMeer's *The Hoegbotton Guide to the Early History of Ambergris by Duncan Shriek* (Necropolitan Press, chapbook, $7.99, 84 pages, ISBN unavailable). This multilayered mock chronicle detailing the history of VanderMeer's imaginary metropolis conceals an infinite variety of pleasures, both cerebral and visceral. Any reader who enjoyed the earlier *Dradin, In Love* (1996) will leap at this book, and the uninitiated should too.

Ever wonder how famous writers got their start? You can discover the answer in the case of Bram Stoker by reading the reprint of his first novel, *The Primrose Path* (Desert Island Books, hardcover, £14.99, 128 pages, ISBN 1-874287-21-X). This temperance novel features horror, but of a gutter-hugging sort, as its protagonist, innocent Irishman Jerry O'Sullivan, falls prey to the ginshops of London. Dickensian in its grim realities, this novel offers insights into Stoker's moral universe. An accompanying short story, "Buried Treasures," reveals a few more-Gothic aspects of Dracula's Dad. The whole volume owes its existence to editor Richard Dalby; whose keen commentary reveals how Dalby discovered these heretofore unreprinted works, and places them squarely in their proper historical context.

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Cyber-astro-millennial Ornithology

If any writer could make computer operating systems sound interesting, it would be Neal Stephenson, and he does just that in his book-length essay, *In the Beginning . . . Was the Command Line* (Avon, trade, $10.00, 151 pages, ISBN 0-380-81593-1). Chronicling the history of the master software that runs all our desktop machines, illustrating the philosophical differences amongst Windows, Linux, BeOs and the Macintosh OS, probing the cultural roots of graphi-

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cal interfaces, Stephenson uses levity and personal anecdotes to render fascinating this abstruse field. Are you a victim of "metaphor shear"? Find out by enjoying Stephenson's brisk think-piece now.

Although labeled a YA book, William Pogue's *How Do You Go to the Bathroom in Space?* (Tor, trade, $11.95, 223 pages, ISBN 0-312-87295-X) holds a multitude of fascinations for readers of any age. Cast in the form of 247 questions and answers (as well as several informational appendices), this book reveals the nitty-gritty workings of space flight and space habitation. First-hand knowledge—astronaut Pogue once held the record for continuous days in space—that I have never seen elsewhere is here disbursed in transparent prose Heinlein might have admired. Whether you live in a vacuum or not, you'll enjoy this compendium of weightless wisdom.

Like the Steve Erickson character who referred to himself as an "apocalyptologist," John Clute pioneers new sociological territory in his *The Book of End Times* (HarperPrism, hardcover, $30.00, 240 pages, ISBN 0-06-105033-4) This massive, spinning, sputtering pinwheel of a coffee-table book (Jesus's or Satan's coffee-table, to be sure) tackles our millennial unease with perception and pep. Ranting sanely like a combination of Ralph Waldo Emerson, J.G. Ballard, and Arthur Kroker, Clute strives valiantly to forestall the "pretty terrible world" he foresees, by applying his critical skills to a variety of postmodern phenomena, including SF. And visually, this retina-blasting assault of a book could be the flashiest issue of *Wired* or *Raygun* yet produced, a survival manual for all us rough beasts slouching toward our new home.

Writing like an amalgam of Annie Dillard, Beryl Markham, and P.J. O'Rourke, Rob Nixon creates a *sui generis* work in his *Dreambirds* (Picador, hardcover, $23.00, 289 pages, ISBN 0-312-24540-8). Born in South Africa, Nixon grew up surrounded by *Struthio camelus*, that absurdest of birds, the ostrich. This book—subtitled "The Natural History of a Fantasy"—is a fetching blend of history, biography, journalism, and nature-writing, all centering around this weird bird (which does *not* bury its head in fear!). Nixon uncovers the nearly forgotten tale of South Africa's ostrich-plume barons, a class brought low by World War I, and by, of all things, the introduction of automobiles, a vehicle that excluded plumed headgear. (Now there's a secondary-effect prediction about technology no SF author early in the century ever thought to make!) Nixon also surveys the brief USA ostrich boomlet of the Nineties and the end of apartheid, all the while detailing his family's quirky chronicle. His prose colloquial yet rich, Nixon holds your attention much like the sight of a flock of ostriches galloping across the desert.

Sometimes I Feel Like a Motherless Borough

Lionel Essrog, a witty fellow who exhibits a certain bulky grace and untutored sensitivity, is the hero and narrator of Jonathan Lethem's fiery-eyed new novel, *Motherless Brooklyn* (Doubleday, hardcover, $23.95, 311 pages, ISBN 0-385-49183-2). A thirtyish rootless loner with an ironic worldview, Lionel at first appears perfectly to embody the archetypical private eye required by Lethem's noir scenario. Too bad then that the lad has a vicious case of Tourette's Syndrome, blasting expletives and Dada phrases at frequent intervals, and indulging helplessly in a broad array of physical tics and compulsions.

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Makes the stylish repartee and suave behavior so integral to the PI's canonical image kind of dicey, don't you know?

With this single stroke of genius—subsequently supported by an immense amount of craft and further subsidiary inspirations—Lethem absolutely inverts and reinvigorates the standard detective novel, creating something rich and strange. But the biggest miracle is that the result of his bold and potentially farcical move is not so much parody as a compassionate, sorrowfully funny extension into unknown genre terrain.

As a teenage orphan, Lionel and three fellow foundlings are taken under the wing of Frank Minna, a slightly older aspiring hoodlum from the mean streets of Crooklyn. Over the next fifteen years, the quartet will become the "Minna Men," an oddball team not unlike the cinematic *Mystery Men* (1999), except even more goofy and powerless. When their mentor is callously and inexplicably murdered, Lionel and the others must find his killer and try to rescue a meaningful independent future for themselves.

Lethem builds a perfectly plausible and intriguing mystery, offering solid clues and a valid solution. He populates his novel with a circus of multi-dimensional characters who are almost as engrossing as Lionel. But his major achievement is Lionel's sustained Tourettic voice. Riffing inventively on certain patterns of words that exhibit a consistent dream logic, Lethem never falters in his intimate depiction of the maddening and frustrating world of the Tourette sufferer. And by making explicit the parallels to Lionel's behavior in the so-called normal world, Lethem shows us just how thinly the line between the damaged and the undamaged soul is drawn.

Traces of Lethem's past fondness for the Phildickian mode surface mostly in the character of a woman named Kimmery, whose rap on the two kinds of Oreo cookies might be inserted without seams straight into *A Scanner Darkly* (1977). But on the whole, the voice in this masterful book belongs to no one save Lethem and Lionel.

There's obviously only one term for a novel this weird and well-done: a *tour(ette's) de force.*

Candle in the Changewinds

Many critics have discerned in Twain's *Huckleberry Finn* (1884) the ultimate embodiment of the modern American spirit. Huck's engaging voice has gone on to flavor hundreds of novels, overtly or covertly. The rascally orphan boy's narrative tone and his worldview—naïve yet canny, good-hearted but scheming, principled but utilitarian, earnest but satirical—sum up a peculiarly American gestalt with unforgettable clarity.

In SF, that voice has been represented by no one so well as Robert Heinlein. Know Twain, and you know Heinlein (if you also season the raw Hannibal, MO, meat with a dash of Thorne Smith and H.G. Wells). So oftentimes, when a critic labels a writer "the new Heinlein," he's really—knowingly or not—just pointing a finger back to Twain.

John Barnes has earned that somewhat misleading label with his previous books, and I suspect his newest will garner the same tag. *Candle* (Tor, hardcover, $22.95, 240 pages, ISBN 0-312-89077-X), however, goes unmistakably straight back to the Ur-model, for it echoes the adventures of Huck and Jim in too great a level of detail to be mere coincidence.

In his earlier novel, *Kaleidoscope Century* (1995), Barnes sketched out

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a vivid and frightening near-future unlike any previously considered. Midway through the twenty-first century, the War of the Memes erupted. Engineered wetware packets transmittable by a variety of means, these infectious agents quickly began to evolve, capturing humans as tokens in their ideological battles, battles that manifested as brutal physical conflicts as well. Millions died and the Earth was almost ruined until the triumph of a single meme, known alternately as One True and Resuna. *Century* was set long after this period, in the 2100s. In *Candle*, Barnes chooses to revist the 2060s, when Terran humanity, united under One True (elsewhere in the Solar System, unmemed humans still exist), is enjoying the kind of rigid Utopia enforced by Jack Williamson's Humanoids.

Our protagonist and narrator, Currie Culver, is the last cowboy hunter, retired searcher after rogues resisting One True's embrace. Alerted by his mental guardian to the reappearance of a cowboy long considered dead, a clever fellow called Lobo, Culver must don his dusty metaphorical spurs for one final solo hunt.

Immediately, the archetypical dimensions of this tale seem apparent. You suspect Barnes of gearing up for some kind of Zelazny-style clash of immortal rivals. But Barnes pulls a sly maneuver. Snared by Lobo early on, Culver soon learns the truth of the net of delusions that has clouded his vision for twenty years. He casts his lot with Lobo, but the two men soon run afoul of One True, who ultimately reveals a further level of complexity that raises the meaning of events to a new level.

The action in *Candle* can be summarized in two sentences: Culver meets Lobo, then gets caught. The two men exchange life stories, then both get swept up in One True's grasp. End of story. Surprisingly, this synopsis can be applied almost perfectly to Huck Finn's adventures as well. Huck and Jim meet, run off, and swap biographies, until it all ends and Huck is sent home. But such a static condensation fails to convey the entrancing allure of either book. I finished *Candle* in two short sittings, so compelling is Barnes's voice and so stimulating the novel's intellectual apparatus. Despite long flashbacks, the pace of the story is still zippy. And the uneasy relations between Culver and his captor demand and satisfy your attention as well. Issues of betrayal nearly identical to those Huck felt toward Jim, as well as the classic home/frontier dissonance, add further weight to the consanguinity between the books.

Like Ken Macleod, Barnes is concerned with the grand struggle between individuality and the survival of society. Weighing a single human soul in one pan of his scales against the greater good of the masses, Barnes comes up with no easy answers. Much as you might like to hate One True, you cannot deny the beneficial accomplishments of this artificial personality, nor its rationality. A lesser writer would have cast the contest in pure black and white. Barnes—like Twain, like Heinlein—discerns much finer gradations of good and evil.

Butterflies Are Free

Let's set up a scale for fiction. We'll call one pole "cerebral" and the other "visceral." The stories at one end are cold, rational, intellectual. The antipodean tales are hot, illogical, emotional. In mainstream fiction, you'd put Umberto Eco at one end and Jim Thompson at the other. Of course, fallacies immediately become appar-

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ent. Eco's books are not without emotion, and Thompson's noir is threaded with sociopolitical arguments.

SF stories have long clustered at the cerebral end. At least that's our public image, when you willfully disregard the sheer emotionalism of such subgenres as space opera. Our kind of fiction is supposed to be all brains and no heart, the Tin Woodsman rather than the Scarecrow. If we have to pick icons for either end of this factitious spectrum, we could do worse than choose Stapledon and Sturgeon. But as with the mainstream examples listed above, such categories quickly collapse. Stapledon felt and expressed radiant emotions, while Sturgeon had Big Ideas. Nonetheless, SF writers can be fruitfully placed on this line for discussion, with someone like Poul Anderson being seen as a useful midpoint.

Greg Egan has long been consigned to the Stapledonian pole. His novels are thought by many to be metaphysical excursions barely anchored by characters, icy and precise, daunting in their intellectual complexity.

I've always maintained, however, that Egan is more well-rounded than this simplified portrait. He does not generally neglect the visceral half of his own personality or of his tales. As a rule, his short stories showcase more of his expertise in emotional areas than his novels. But even in his longer works, there are hooks straight into the reader's guts.

Egan's newest, *Teranesia* (Gollancz, hardcover, £16.99, 249 pages, ISBN 0-57506-854-X/HarperPrism, hardcover, $24.00, 295 pages, ISBN 0-06-105092-X) is more like one of his short stories writ large. Not to claim it's padded, but simply to say that the focus this time is the intensely emotional travails of its protagonist, under the assaults of life-events both common and fantastic. Ontology and epistemology take a back seat this time to jealousy, guilt, fear, and love.

We ride the shoulders of Prabir Suresh, an intelligent but otherwise typical nine-year-old in the year 2010 when the book opens. Prabir and his younger sister Madhusree live with their parents on the tropical island Prabir has nicknamed Teranesia. Prabir's parents are scientists, researching the strange mutations arising among the butterfly population on the remote atoll. It's an idyllic existence in many ways, granting Prabir immense freedoms.

Until war erupts among the nearby states of Indonesia. Touched by a malign tentacle of this conflict, Prabir and Madhusree are orphaned. Through tenacity and bravery, they escape, landing eventually with an aunt in Canada. There, Prabir and Madhusree grow to seemingly undamaged adulthood. But beneath their surface successes, both are still scarred from the events of their youth. And the mysterious source of the Teranesian mutations, left unexamined for eighteen years, has not dissipated, but rather blossomed and spread. Ineleuctably, Prabir and Madhusree are drawn back to Teranesia, there to confront both their own pathologies and an infection that might doom the globe.

Let us concede that Egan's scientific mystery will be typical of his engrossing speculations, mind-blowing in its philosophical dimensions. What of his characterization? I would compare Prabish to the titular lead in Maureen McHugh's *China Mountain Zhang* (1992) for depth of fictional reality, especially since both characters share a gay sexual orientation. (This is not the first time Egan's dealt with gay characters in commendable ways.) The fullness of Prabir's psyche and his emotional reactions to events are rich and convincing. The lesser characters share this complexity.

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Another aspect of this book you might not expect is Egan's satirical bent. A running riff about semioticly blithering academic idiots provides a lot of chuckles. (Prabir's aunt and boyfriend are two such.) And consider this passage: ". . . *BladeRunner*™ *OnIce* ™ *with MusicintheStyleof* ™ *GilbertandSullivan* ™. He'd heard that the show was distantly derived from a halfway decent science-fiction novel, but no evidence of that survived amongst the fog, laser beams, and black rubber costumes. During the interval, a dismebodied voice calling itself 'Radio KJTR' cackled inanities about sex with amputees." Pure Ron Goulart.

I would have to claim, however, that the most influential template for this book looks to be J.G. Ballard, specifically his *Rushing to Paradise* (1995), with its island-trapped young boy amidst deluded and deadly academics. Guess who wrote this: "If his roots were here [the ocean], he had no sense of it; his body had built its own tamed sea and escaped to another world, as surely as if it had ascended into interstellar space, too long ago to remember." Here's a hint: it's not Ballard in, say, *The Drowned World* (1962).

With its lovely and touching circular ending, where Prabir literally merges with the butterflies he once betrayed, Egan's *Teranesia* reveals a writer who spans both poles of our genre with ease and grace.

Me Tarzan, You Thrilled

On a netlist I belong to, a recent discussion ocurred regarding "the most memorable characters of the millennium." A lot of famous names popped up, including King Arthur, Sherlock Holmes, Batman, and Gollum. And although the final consensus seemed to reside in the Man of La Mancha, Don Quixote, as being our millennium's best literary emblem, one of the strongest contenders was, quite deservedly so, a certain ape-man named Tarzan.

Now, I'm no ERB expert. I've read the Mars, Venus, and Pellucidar series, but none of the Tarzans, except the crossover *Tarzan at the Earth's Core* (1930). Yet the savagely refined Lord Greystoke has such cultural presence that any halfway literate reader experiences instant recognition when presented with the standard Tarzanian milieu. Plunging enjoyably into a new Tarzan adventure, then, should not require intimate knowledge of every single one of Tarzan's past exploits—although if the new saga is done well, we can expect that it will resonate with these prior tales in the minds of the true fans. And since I *do* consider myself well-read in the *oeuvre* of the astonishing Philip José Farmer, I felt supremely confident that I would qualify to appreciate Farmer's *The Dark Heart of Time* (DelRey, mass-market, $6.99, 278 pages, ISBN 0-345-42463-8), his estate-authorized Tarzan novel. And guess what—I was right! This is a book so well-done and inviting that any fan of old-fashioned adventure-writing will feel right at home, long-time Tarzanophile or not.

Tarzan was incarnated in 1912, while Farmer breathed his first in 1918. If we regard Tarzan as PJF's admired big brother, we begin to sense the dominance this fictional character has had in Farmer's mental and artistic life. As Farmer says in a short preface, this book "fulfills a seventy-year-old ambition." True, Farmer has made much use of Tarzan-by-other-names in his past fiction. His intricate "Wold Newton Family" series postulates that Tarzan was one of a clan of superhuman mutants that includes Doc Savage as well. Amusingly, there are a couple of sly hooks to this the-

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ory in the new book, but no psychosexual speculations along the outrageous lines of *A Feast Unknown* (1969). Farmer maintains a G-rated textual innocence in line with Burroughs's own proclivities.

The adventure here seems to be fitted cleverly into the interstices of Tarzan's historic exploits. At the opening of the book, Tarzan is in search of the kidnapped Jane. At the novel's somewhat hasty conclusion, he has finally found and rescued her, but all offstage. I suppose this weird omission happens because this whole event is already covered in one of the canonical texts. The MacGuffin of this book, then, is particularly distracting, since we sense it will never be resolved in the span of these pages. The other main plot engine is an attempt by some hired Frank Buck types to capture Tarzan at the behest of elderly millionaire James D. Stonecraft, who suspects Tarzan's body of harboring the secret of immortality. When Stonecraft or the hunters are onstage, the novel sags a trifle.

But, oh, during the majority of the passages, those devoted to the astonishing capabilities of the one and only ape-man—what delicious thrills and chills abound! Farmer is ten times the craftsman Burroughs ever was, and he succeeds in replicating and refining ERB's prose. It's long been known that Farmer can put together dynamic scenes of physical action with grace and guile, but he really becomes inspired here. In such scenes as the one when Tarzan is swept up in an earthquake-triggered flood, Farmer sets your heart racing as fast as Tarzan's. The centerpiece of the book is surely the over-the-top episode when Tarzan, hands bound, engineers an escape from a cage suspended in the treetops. Farmer pulls out all the stops here, eventually hanging Tarzan over a deathly abyss by just a twig piercing his flesh!

Just as admirable is Farmer's depiction of Tarzan's inner life. The ape-man's unique mix of civilized and bestial perceptions and judgments is never inconsistent, and always intriguing. Also, two supporting characters—a bear-man named Rahb and a timorous bard named Waganero—exhibit an attractive surface. In fact, such interesting folks are disposed of rather too summarily for my taste.

Farmer's main charm in the telling of his tale is to inhabit the modalities of Burroughs's era wholeheartedly, without a trace of irony or campiness. Only a couple of anachronisms—the late-twentieth-century slang term "scam" and the redundant phrase "silent movie" (what other kind was there in Tarzan's 1918?)—betray that this book exists in 1999 rather than 1919.

Don a loincloth, grab a vine, and swing into Farmer's recreation of an extravagant Africa that never was. You'll have a chest-thumping good time!

Isis Loves You to Death

In my review of Robert Charles Wilson's fine *Darwinia* (1998) I chose to compare him to Clifford Simak. Coincidentally or not, Wilson's newest book, *Bios* (Tor, hardcover, $22.95, 208 pages, ISBN 0-312-86857-X), manipulates the same riffs forever immortalized in a classic Simak story, "Beachhead." For those who have never encountered the Simak tale before: a hard-bitten interstellar expeditionary force sets down on a jungle world to establish mankind's claim. They eventually find that all their crumbling hardware is as naught in the face of the relentless alien ecology, and end their lives as helpless castaways. With the stark poetry Simak was justly famous for, the story clos-

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es thusly: "Now, for the first time since they had landed, he caught in the wind the alien smell of an alien world."

Wilson's novel recapitulates just such an encounter, adding many intriguing contextual fillips, a deeper analysis of biological possibilities, and more sophisticated characterizations. It's intriguing to note also how this book reflects a sea-change in our attitude toward exploration and colonization. Although the terrestrial visitors to Wilson's deadly new globe indeed intend to exploit it scientifically for profits, there is no military component as in Simak's story, which automatically assumed that the Space Marines would accompany any expeditions. And as for Harry Harrison's gloriously unrepentant blast-the-hell-out-of-the-critters *Deathworld* (1960)—well, the past is indeed a foreign country!

Wilson's book takes place sometime in the twenty-second century. Having survived various upheavals, the solar system is now fairly well settled, with a new rigid social structure of Trusts and Families in place as a kind of quasi-Imperial-Chinese caste arrangement. A single outpost, reached by instantaneous but expensive "Higgs transition," is maintained at the far-off star that is host to the world known as Isis. An orbiting facility supports four ground-based stations. But the orbital residents are the only humans in a relatively safe environment. Over billions of years of isolation, Isis has developed an oddly complex inimical ecology which mounts a continual attack against the human intruders. Only elaborate barriers and precautions protect the scientists. And even these safeguards are proving faulty, as Isis evolves to deal more savagely with the foreign technology.

A young woman named Zoe Fisher is Earth's latest answer to this assault. She has been bioengineered to resist the fatal encroachments of Isis, her body souped-up in the kind of adaptive maneuver that James Blish termed "pantropy," the obverse of terraforming. (Think also of Frederik Pohl's *Man Plus* [1976]). Zoe's arrival at Isis will coincide with a dramatic leap in the aggressiveness of the planet, and her unshielded entry into the ecology will be accompanied by the utter collapse of all human settlements and the revelation of a higher purpose to the planet's ferocity.

Despite a hopeful coda, this is a book that exhibits a kind of Tiptreean despair about mankind's place in the universe. In fact, certain scenes of alien infestation verge on horror writing, and a numinous undercurrent to this novel serves to obviate the best that science has to offer in favor of mankind's more karmic qualities.

One other novel, nearly forgotten, popped up from memory during my reading of *Bios*. As a teenager, I loved Piers Anthony's *Omnivore* (1968), which concerned a hostile mushroom-based world called Nacre. The three people sent to tame Nacre formed a kind of *Mod Squad* in space (*mushrooms,* man!), and their hippy-dippy approach to problem-solving represented a contemporary antithesis to the aforementioned *Deathworld*. It's pertinent to our times and to postmodern SF that Wilson's *Bios,* however streamlined and more "realistic" it undoubtedly is, seems to have lost the kind of innocent sense of wonder possessed by Anthony's early book, and even by Harrison's.

Are there worlds out in the universe that we can love without destroying, and which might love us back without destroying us in turn? The jury is still out, but the probabilities for a hippy-dippy love-in cosmos don't look good. O

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SF CONVENTIONAL CALENDAR

There's something coming up for everybody over the big Memorial Day weekend. Plan now for social weekends with your favorite SF authors, editors, artists, and fellow fans. For an explanation of con(vention)s, a sample of SF folksongs, and info on fanzines and clubs, and how to get a later, longer list of cons, send me an SASE (self-addressed, stamped #10 [business] envelope) at 10 Hill #22-L, Newark NJ 07102. The hot line is (973) 242-5999. If a machine answers (with a list of the week's cons), leave a message and I'll call back on my nickel. When writing cons, send an SASE. For free listings, tell me of your con 6 months out. Look for me at cons behind the Filthy Pierre badge, playing a musical keyboard. - Erwin S. Strauss

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19-21—**DeepSouthCon.** (E-mail) **wcfrancis@compuserve.com.** Jekyll Inn, Jekyll Island GA. McDevitt, Walotsky, Steele.

19-21—**ConDuit. (801) 294-9297.** (E-mail) **conduit@conduit.sfcon.org.** Airport Hilton, Salt Lake City UT. C. de Lint.

19-21—**KeyCon.** (E-mail) **stornel@icenter.net.** Radisson, Winnipeg MB. J. Roberson, I. Kordey, T. Hogue, M. Sheard.

19-21—**Nebula Awards.** Crowne Plaza, New York NY. SF/Fantasy Writers of America annual awards weekend.

19-21—**FedCon. (0821) 219-0932.** (E-mail) **monica@fedcon.de.** Maritim Hotel, Bonn, Germany. Spiner, Sirtis. Star Trek.

26-28—**MarCon. (614) 470-5448.** (E-mail) **info@marcon.org.** Hyatt, Columbus OH. Don Maitz, Janny Wurts, S. MacDonald.

26-28—**Oasis. (407) 263-5822.** (E-mail) **jcr@digital.net.** Radisson, Orlando FL. E. Moon, Rowena, the Suttons, B. Bova.

26-28—**WisCon. (608) 233-8850.** Concourse Hotel, Madison WI. SF/fantasy & issues of feminism, gender, race, class.

26-28—**ConQuest. (913) 768-0779.** (E-mail) **sfreader@unicom.net.** Park Place Hotel, Kansas City MO. W. Williams, Foster.

26-28—**MisCon.** (E-mail) **enigma@bigsky.net.** Missoula MT. Steve Jackson, Jesse Marcel Jr., Tom Smith, Dragon.

26-28—**AngliCon. (206) 789-2748.** (Web) **webwitch.com/anglicon.** Seattle WA. British media.

26-29—**BayCon. (408) 450-1788.** (Web) **baycon.org.** Doubletree, San Jose CA. Esther Friesner, Baron Engel, D. Clark.

26-29—**LibertyCon.** (E-mail) **libcon@cdc.net.** Ramada Inn S., Chattanooga TN. C. J. Cherryh, W. A. Tucker, S. Green.

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26-29—**PloktaCon.** (E-mail) **mike@plokta.com.** Holiday Inn, Leicester England. Ken MacLeod. Small, friendly SF event.

26-29—**Legacy. (888) 546-7580.** Omni Shoreham Hotel, Washington DC. Wingfield, McAsh, Gord. For Highlander fans.

27-28—**Creation. (818) 409-0960.** (E-mail) **tickets@creationent.com.** Orlando FL. Commercial Hercules and Xena event.

27-28—**Silver Arrow.** (E-mail) **solas@wayland.swinternet.co.uk** Hilton, Bristol England. For Robin of Sherwood fans.

27-28—**VulKon. (954) 441-8735.** (E-mail) **joemotes@aol.com.** Atlanta GA. Commercial Star Trek event.

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2-4—**Project A-Kon, 3352 Broadway Blvd. #470, Garland TX 75043. (972) 278-6850.** Hyatt, DFW Airport TX. Anime.

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2-4—**ClaveCon, Box 10734, New Brunswick NJ 08906.** (E-mail) **clavecon@hotmail.com.** Ramada, Fanwood NJ. SF & law.

2-4—**Book Expo, Box 110249, Carrollton TX 75011. (800) 840-5614.** McCormick Place, Chicago IL. Book trade only meet.

9-11—**ConSortium, 349 El Dorado, Webster TX 77598. (281) 286-9282.** (E-mail) **horizong@flash.net.** Radisson, Houston TX.

9-11—**Empire Union, 707 Kirts Blvd. #103, Troy MI 48084.** (E-mail) **paladin@customnet.net.** Clarion Airport, Detroit MI.

9-12—**SF Days NRW, e. V AM Kattenbrauck 28, Dortmund D-44287, DE. (+49) 2301-5785.** (E-mail) **sftagenrw@epilog.de.**

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NEXT ISSUE

AUGUST COVER STORY

Hugo-, Nebula-, and World Fantasy Award-winner **Lucius Shepard**, one of the legends of our field, returns after too long an absence with our cover story for August, a big new novella that takes us to the strange, haunted landscape of a high-tech future Vietnam, for a powerful, darkly lyrical, and high-intensity study of hatred, compassion, betrayal, and redemption, and of the many different kinds of ghosts—all bathed in the eerie glow of a "Radiant Green Star." This is another story that people will be talking about for months to come, so don't miss it!

OTHER TOP-FLIGHT WRITERS

R. Garcia y Robertson, one of the best adventure writers in the business, takes us back in time, and into the middle of a very nasty little war (even if it is being fought with swords and bows, rather than more modern weapons!), for a quirky, exciting, and sizzlingly fast-paced look at the critical distinction between "One-Eyed Jacks and Suicide Kings"; Hugo and Nebula-winner **Nancy Kress** gives us a razor-sharp glimpse—the kind that draws blood—of the price you have to pay (and who has to pay it) "To Cuddle Amy"; **Brian Stableford** visits a wired-up high-tech future to cautiously examine "The Ladykiller, As Observed from a Safe Distance"; **Robert Reed**, one of our most popular and prolific authors, bravely ventures into the far-future to take a look at what really happens "When It Ends"; and **R. Neube** returns with a breakneck, zestful, and funny warning about the dangers of babysitting. . . . **Especially** if the person you're babysitting is a crazed, spoiled, out-of-control genius bent on self-destruction (and on taking you with him!), as we get ringside seats for the head-on confrontation of "The Wurst King vs Aluminum Foil Boy."

EXCITING FEATURES

Karen Haber, standing-in for **Robert Silverberg**, gives us a guest "Reflections" column that puts forth the proposition that "Science Fiction Is Easy, Life Is Hard"; **Paul Di Filippo** brings us "On Books"; and Internet columnist **James Patrick Kelly** returns with an "On The Net" column; plus an array of cartoons, poems, letters, and other features. Look for our July issue on sale on your newsstand on July 11, 2000, or subscribe today (you can now also subscribe electronically, online, at our *Asimov's* Internet website, at *http://www.asimovs.com*), and be sure that you miss none of the great stuff we have coming up for you in the rest of the year!

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